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NEWS 4	May 12	Polymer links for the POLYLINK command completed in REGISTRY
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NEWS 10	Jul 30	BEILSTEIN on STN workshop to be held August 24 in conjunction with the 228th ACS National Meeting
NEWS 11	AUG 02	IFIPAT/IFIUDB/IFICDB reloaded with new search and display fields
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NEWS 13	AUG 02	STN User Update to be held August 22 in conjunction with the 228th ACS National Meeting
NEWS 14	AUG 02	The Analysis Edition of STN Express with Discover! (Version 7.01 for Windows) now available
NEWS 15	AUG 04	Pricing for the Save Answers for SciFinder Wizard within STN Express with Discover! will change September 1, 2004
NEWS 16	AUG 27	BIOCOMMERCE: Changes and enhancements to content coverage
NEWS 17	AUG 27	BIOTECHABS/BIOTECHDS: Two new display fields added for legal status data from INPADOC
NEWS 18	SEP 01	INPADOC: New family current-awareness alert (SDI) available
NEWS 19	SEP 01	New pricing for the Save Answers for SciFinder Wizard within STN Express with Discover!
NEWS 20	SEP 01	New display format, HITSTR, available in WPIDS/WPINDEX/WPIX
NEWS 21	SEP 14	STN Patent Forum to be held October 13, 2004, in Iselin, NJ

NEWS EXPRESS	JULY 30 CURRENT WINDOWS VERSION IS V7.01, CURRENT MACINTOSH VERSION IS V6.0c(ENG) AND V6.0Jc(JP), AND CURRENT DISCOVER FILE IS DATED 11 AUGUST 2004
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FILE 'HOME' ENTERED AT 16:11:28 ON 15 SEP 2004

=> file medline, uspatful, dgene, embase, wpids, fsta, cen, ceaba, biosis
COST IN U.S. DOLLARS SINCE FILE ENTRY 0.21 TOTAL SESSION 0.21

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=> s Anthozoan
L1 522 ANTHOZOAN

=> s Cnidarian
L2 1784 CNIDARIAN

=> s l1 and l2
L3 81 L1 AND L2

=> d l3 ti abs ibib 1-10

L3 ANSWER 1 OF 81 MEDLINE on STN
TI The **cnidarian** and the canon: the role of Wnt/beta-catenin signaling in the evolution of metazoan embryos.
AB In a recent publication, Wikramanayake and colleagues have implicated the canonical Wnt/beta-catenin signaling pathway as a mediator of axial polarity and germ-layer specification in embryos of the **cnidarian** Nematostella. In this **anthozoan**, beta-catenin is localized in nuclei of blastomeres in one region of the 16- to 32-cell embryo whose descendants subsequently form the entoderm of the embryo. They claim that the pattern of nuclear localization is significant for two reasons: (1) when nuclear localization of beta-catenin was inhibited, gastrulation does not occur, and (2) when localization of beta-catenin took place in all cells of the pregastrula embryo, the number of entodermal cells increases. Since the Wnt/beta-catenin signaling pathway also plays a role in establishing axial polarity and specifying endoderm and mesoderm in a

number of bilaterians, Wikramanayake et al. imply that this developmental mechanism is an evolutionary inheritance from a radially symmetrical ancestor. Some of the gaps in the current evidence, which must be filled to evaluate their interpretation, are discussed.

ACCESSION NUMBER: 2004212195 MEDLINE
DOCUMENT NUMBER: PubMed ID: 15112227
TITLE: The **cnidarian** and the canon: the role of Wnt/beta-catenin signaling in the evolution of metazoan embryos.
AUTHOR: Primus Alex; Freeman Gary
CORPORATE SOURCE: Section of Integrative Biology, University of Texas, Austin, TX 78712, USA.. primus_alexander@mail.utexas.edu
SOURCE: BioEssays : news and reviews in molecular, cellular and developmental biology, (2004 May) 26 (5) 474-8. Journal code: 8510851. ISSN: 0265-9247.
PUB. COUNTRY: United States
DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals
ENTRY MONTH: 200407
ENTRY DATE: Entered STN: 20040428
Last Updated on STN: 20040723
Entered Medline: 20040722

L3 ANSWER 2 OF 81 MEDLINE on STN
TI EST analysis of the **cnidarian** Acropora millepora reveals extensive gene loss and rapid sequence divergence in the model invertebrates.
AB A significant proportion of mammalian genes are not represented in the genomes of Drosophila, Caenorhabditis or Saccharomyces, and many of these are assumed to have been vertebrate innovations. To test this assumption, we conducted a preliminary EST project on the **anthozoan cnidarian**, Acropora millepora, a basal metazoan. More than 10% of the Acropora ESTs with strong metazoan matches to the databases had clear human homologs but were not represented in the Drosophila or Caenorhabditis genomes; this category includes a surprising diversity of transcription factors and metabolic proteins that were previously assumed to be restricted to vertebrates. Consistent with higher rates of divergence in the model invertebrates, three-way comparisons show that most Acropora ESTs match human sequences much more strongly than they do any Drosophila or Caenorhabditis sequence. Gene loss has thus been much more extensive in the model invertebrate lineages than previously assumed and, as a consequence, some genes formerly thought to be vertebrate inventions must have been present in the common metazoan ancestor. The complexity of the Acropora genome is paradoxical, given that this organism contains apparently few tissue types and the simplest extant nervous system consisting of a morphologically homogeneous nerve net.
ACCESSION NUMBER: 2003599137 MEDLINE
DOCUMENT NUMBER: PubMed ID: 14680636
TITLE: EST analysis of the **cnidarian** Acropora millepora reveals extensive gene loss and rapid sequence divergence in the model invertebrates.
COMMENT: Comment in: Curr Biol. 2004 Feb 3;14(3):R106-8. PubMed ID: 14986636
AUTHOR: Kortschak R Daniel; Samuel Gabrielle; Saint Robert; Miller David J
CORPORATE SOURCE: Centre for the Molecular Genetics of Development and Molecular Genetics and Evolution Group, Research School of Biological Sciences, Australian National University, P.O. Box 475, Canberra, ACT 2601, Australia.
SOURCE: Current biology : CB, (2003 Dec 16) 13 (24) 2190-5. Journal code: 9107782. ISSN: 0960-9822.
PUB. COUNTRY: England: United Kingdom

DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals
ENTRY MONTH: 200403
ENTRY DATE: Entered STN: 20031219
Last Updated on STN: 20040320
Entered Medline: 20040319

L3 ANSWER 3 OF 81 MEDLINE on STN
TI Hox and paraHox genes from the **anthozoan** Parazoanthus parasiticus.
AB We surveyed the genome of the Caribbean zoanthid Parazoanthus parasiticus for Hox and paraHox genes, and examined gene expression patterns for sequences we uncovered. Two Hox genes and three paraHox genes were identified in our surveys. The Hox genes belong to anterior and posterior classes. In phylogenetic analyses, the anterior Hox sequence formed an **anthozoan**-specific cluster that appears to be a second class of **cnidarian** anterior Hox gene. The presence of an anterior Gsx-like paraHox gene supports the hypothesis that duplication of a protoHox gene family preceded the divergence of the Cnidaria and bilaterians. The presence of two Mox class paraHox genes in P. parasiticus deserves further attention. Expression analysis using RT-PCR, indicated that one Mox gene and the anterior paraHox gene are not expressed in adult tissue, whereas the other three sequences are expressed in both dividing and unitary polyps. Dividing polyps showed slightly lower Ppox1 (i.e., Mox) expression levels. Our data add to the number of published **anthozoan** sequences, and provide additional detail concerning the evolutionary significance of **cnidarian** Hox and paraHox genes.
ACCESSION NUMBER: 2003391565 MEDLINE
DOCUMENT NUMBER: PubMed ID: 12927136
TITLE: Hox and paraHox genes from the **anthozoan** Parazoanthus parasiticus.
AUTHOR: Hill April; Wagner Aimee; Hill Malcolm
CORPORATE SOURCE: Biology Department, Fairfield University, Fairfield, CT 06430, USA.. ahill@fair1.fairfield.edu
SOURCE: Molecular phylogenetics and evolution, (2003 Sep) 28 (3) 529-35.
Journal code: 9304400. ISSN: 1055-7903.
PUB. COUNTRY: United States
DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals
ENTRY MONTH: 200404
ENTRY DATE: Entered STN: 20030821
Last Updated on STN: 20040407
Entered Medline: 20040406

L3 ANSWER 4 OF 81 MEDLINE on STN
TI The ancestral role of Brachyury: expression of NemBra1 in the basal **cnidarian** Nematostella vectensis (Anthozoa).
AB The T-Box transcription factor Brachyury plays important roles in the development of all bilateral animals examined so far. In order to understand the ancestral function of Brachyury we cloned NemBra1, a Brachyury homolog from the **anthozoan** sea anemone Nematostella vectensis. Anthozoa are considered the basal group among the Cnidaria. First NemBra1 expression could be detected at the blastula/gastrula transition and gene activity persists until adulthood of the animals. In situ hybridization shows that NemBra1 expression in gastrulae and early planula larvae is restricted to a circle around the blastopore. When the larvae begin to metamorphose into primary polyps, the expression zone extends into the developing mesenteries. In adult polyps Brachyury expression persists in the mesenteries, but is excluded from the septal filament and the differentiated retractor muscles, which also develop from the mesenteries. We conclude that the ancestral function of Brachyury was

in specifying the blastopore and its endodermal derivatives.

ACCESSION NUMBER: 2003028223 MEDLINE
DOCUMENT NUMBER: PubMed ID: 12536320
TITLE: The ancestral role of Brachyury: expression of NemBra1 in the basal **cnidarian** Nematostella vectensis (Anthozoa).
AUTHOR: Scholz Corinna B; Technau Ulrich
CORPORATE SOURCE: Molecular Cell Biology, Institute of Zoology, Darmstadt University of Technology, Schnittspahnstrasse 10, 64287 Darmstadt, Germany.. Technau@bio.tu-darmstadt.de
SOURCE: Development genes and evolution, (2003 Jan) 212 (12) 563-70.
Journal code: 9613264. ISSN: 0949-944X.
PUB. COUNTRY: Germany: Germany, Federal Republic of
DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals
ENTRY MONTH: 200308
ENTRY DATE: Entered STN: 20030122
Last Updated on STN: 20030823
Entered Medline: 20030822

L3 ANSWER 5 OF 81 MEDLINE on STN
TI Precambrian animal life: probable developmental and adult **cnidarian** forms from Southwest China.
AB The evolutionary divergence of **cnidarian** and bilaterian lineages from their remote metazoan ancestor occurred at an unknown depth in time before the Cambrian, since crown group representatives of each are found in Lower Cambrian fossil assemblages. We report here a variety of putative embryonic, larval, and adult microfossils deriving from Precambrian phosphorite deposits of Southwest China, which may predate the Cambrian radiation by 25-45 million years. These are most probably of **cnidarian** affinity. Large numbers of fossilized early planula-like larvae were observed under the microscope in sections. Though several forms are represented, the majority display remarkable conformity, which is inconsistent with the alternative that they are artifactual mineral inclusions. Some of these fossils are preserved in such high resolution that individual cells can be discerned. We confirm in detail an earlier report of the presence in the same deposits of tabulates, an extinct crown group **anthozoan** form. Other sections reveal structures that most closely resemble sections of basal modern corals. A large number of fossils similar to modern hydrozoan gastrulae were also observed. These again displayed great morphological consistency. Though only a single example is available, a microscopic animal remarkably similar to a modern adult hydrozoan is also presented. Taken together, the new observations reported in this paper indicate the existence of a diverse and already differentiated **cnidarian** fauna, long before the Cambrian evolutionary event. It follows that at least stem group bilaterians must also have been present at this time.

ACCESSION NUMBER: 2002393732 MEDLINE
DOCUMENT NUMBER: PubMed ID: 12142030
TITLE: Precambrian animal life: probable developmental and adult **cnidarian** forms from Southwest China.
AUTHOR: Chen Jun-Yuan; Oliveri Paola; Gao Feng; Dornbos Stephen Q; Li Chia-Wei; Bottjer David J; Davidson Eric H
CORPORATE SOURCE: Nanjing Institute of Geology and Paleontology, Nanjing 210008, China.
SOURCE: Developmental biology, (2002 Aug 1) 248 (1) 182-96.
Journal code: 0372762. ISSN: 0012-1606.
(Investigators: Davidson E H, CA Inst Technol, Pasadena)
PUB. COUNTRY: United States
DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals; Space Life Sciences

ENTRY MONTH: 200208
ENTRY DATE: Entered STN: 20020727
Last Updated on STN: 20020917
Entered Medline: 20020829

L3 ANSWER 6 OF 81 MEDLINE on STN
TI The evolution of nuclear receptors: evidence from the coral Acropora.
AB We have amplified and sequenced PCR products derived from 10 nuclear receptor (NR) genes from the **anthozoan cnidarian** Acropora millepora, including five products corresponding to genes not previously reported from the phylum Cnidaria. cDNAs corresponding to seven of these products were sequenced and at least three encode full-length proteins, increasing the number of complete **cnidarian** NR coding sequences from one to four. All clear orthologs of Acropora NRs either lack an activation domain or lack a known ligand, consistent with the idea that the ancestral nuclear receptor was without a ligand. Phylogenetic analyses indicate that most, and possibly all, presently identified **cnidarian** NRs are members of NR subfamily 2, suggesting that the common ancestor of all known nuclear receptors most resembled members of this subfamily.

ACCESSION NUMBER: 2001558273 MEDLINE
DOCUMENT NUMBER: PubMed ID: 11603940
TITLE: The evolution of nuclear receptors: evidence from the coral Acropora.
AUTHOR: Grasso L C; Hayward D C; Trueman J W; Hardie K M; Janssens P A; Ball E E
CORPORATE SOURCE: Research School of Biological Sciences, Australian National University, Canberra, ACT 2601, Australia.
SOURCE: Molecular phylogenetics and evolution, (2001 Oct) 21 (1) 93-102.
Journal code: 9304400. ISSN: 1055-7903.
PUB. COUNTRY: United States
DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals
ENTRY MONTH: 200112
ENTRY DATE: Entered STN: 20011018
Last Updated on STN: 20020122
Entered Medline: 20011205

L3 ANSWER 7 OF 81 MEDLINE on STN
TI Gene structure and larval expression of cnox-2Am from the coral Acropora millepora.
AB We have cloned a Hox-like gene, cnox-2Am, from a staghorn coral, Acropora millepora, an **anthozoan cnidarian**, and characterised its embryonic and larval expression. cnox-2Am and its orthologs in other cnidarians and Trichoplax most closely resemble the Gsx and, to a lesser extent, Hox 3/4 proteins. Developmental northern blots and in situ hybridisation are consistent in showing that cnox-2Am message appears in the planula larva shortly after the oral/aboral axis is formed following gastrulation. Expression is localised in scattered ectodermal cells with a restricted distribution along the oral/aboral body axis. They are most abundant along the sides of the cylindrical larva, rare in the oral region and absent from the aboral region. These cells, which on morphological grounds we believe to be neurons, are of two types; one tri-or multipolar near the basement membrane and a second extending projections in both directions from a mid-ectodermal nucleus. Anti-RFamide staining reveals neurons with a similar morphology to the cnox-2Am-expressing cells. However, RFamide-expressing neurons are more abundant, especially at the aboral end of the planula, where there is no cnox-2Am expression. The pattern of expression of cnox-2Am resembles that of Gsx orthologs in Drosophila and vertebrates in being expressed in a spatially restricted portion of the nervous system.

ACCESSION NUMBER: 2001183688 MEDLINE
DOCUMENT NUMBER: PubMed ID: 11277400
TITLE: Gene structure and larval expression of cnox-2Am from the coral Acropora millepora.
AUTHOR: Hayward D C; Catmull J; Reece-Hoyes J S; Berghammer H; Dodd H; Hann S J; Miller D J; Ball E E
CORPORATE SOURCE: Research School of Biological Sciences, Australian National University, Canberra.
SOURCE: Development genes and evolution, (2001 Jan) 211 (1) 10-9. Journal code: 9613264. ISSN: 0949-944X.
PUB. COUNTRY: Germany: Germany, Federal Republic of
DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals
OTHER SOURCE: GENBANK-AF245689
ENTRY MONTH: 200108
ENTRY DATE: Entered STN: 20010827
Last Updated on STN: 20010827
Entered Medline: 20010823

L3 ANSWER 8 OF 81 MEDLINE on STN
TI Pax gene diversity in the basal **cnidarian** Acropora millepora (Cnidaria, Anthozoa): implications for the evolution of the Pax gene family.
AB Pax genes encode a family of transcription factors, many of which play key roles in animal embryonic development but whose evolutionary relationships and ancestral functions are unclear. To address these issues, we are characterizing the Pax gene complement of the coral Acropora millepora, an **anthozoan cnidarian**. As the simplest animals at the tissue level of organization, cnidarians occupy a key position in animal evolution, and the Anthozoa are the basal class within this diverse phylum. We have identified four Pax genes in Acropora: two (Pax-Aam and Pax-Bam) are orthologs of genes identified in other cnidarians; the others (Pax-Cam and Pax-Dam) are unique to Acropora. Pax-Aam may be orthologous with Drosophila Pox neuro, and Pax-Bam clearly belongs to the Pax-2/5/8 class. The Pax-Bam Paired domain binds specifically and preferentially to Pax-2/5/8 binding sites. The recently identified Acropora gene Pax-Dam belongs to the Pax-3/7 class. Clearly, substantial diversification of the Pax family occurred before the Cnidaria/higher Metazoa split. The fourth Acropora Pax gene, Pax-Cam, may correspond to the ancestral vertebrate Pax gene and most closely resembles Pax-6. The expression pattern of Pax-Cam, in putative neurons, is consistent with an ancestral role of the Pax family in neural differentiation and patterning. We have determined the genomic structure of each Acropora Pax gene and show that some splice sites are shared both between the coral genes and between these and Pax genes in triploblastic metazoans. Together, these data support the monophyly of the Pax family and indicate ancient origins of several introns.
ACCESSION NUMBER: 2000243720 MEDLINE
DOCUMENT NUMBER: PubMed ID: 10781047
TITLE: Pax gene diversity in the basal **cnidarian** Acropora millepora (Cnidaria, Anthozoa): implications for the evolution of the Pax gene family.
AUTHOR: Miller D J; Hayward D C; Reece-Hoyes J S; Scholten I; Catmull J; Gehring W J; Callaerts P; Larsen J E; Ball E E
CORPORATE SOURCE: Department of Biochemistry and Molecular Biology, James Cook University, Townsville, Queensland 4811, Australia.. david.miller@jcu.edu.au
SOURCE: Proceedings of the National Academy of Sciences of the United States of America, (2000 Apr 25) 97 (9) 4475-80. Journal code: 7505876. ISSN: 0027-8424.
PUB. COUNTRY: United States
DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English

FILE SEGMENT: Priority Journals
OTHER SOURCE: GENBANK-AF053458; GENBANK-AF053459; GENBANK-AF241310; GENBANK-AF241311
ENTRY MONTH: 200005
ENTRY DATE: Entered STN: 20000606
Last Updated on STN: 20000606
Entered Medline: 20000524

L3 ANSWER 9 OF 81 MEDLINE on STN
TI Precambrian animal diversity: putative phosphatized embryos from the Doushantuo Formation of China.
AB Putative fossil embryos and larvae from the Precambrian phosphorite rocks of the Doushantuo Formation in Southwest China have been examined in thin section by bright field and polarized light microscopy. Although we cannot completely exclude a nonbiological or nonmetazoan origin, we identified what appear to be modern **cnidarian** developmental stages, including both **anthozoan** planula larvae and hydrozoan embryos. Most importantly, the sections contain a variety of small (</=200 microm) structures that greatly resemble gastrula stage embryos of modern bilaterian forms.
ACCESSION NUMBER: 2000243717 MEDLINE
DOCUMENT NUMBER: PubMed ID: 10781044
TITLE: Precambrian animal diversity: putative phosphatized embryos from the Doushantuo Formation of China.
AUTHOR: Chen J Y; Oliveri P; Li C W; Zhou G Q; Gao F; Hagadorn J W; Peterson K J; Davidson E H
CORPORATE SOURCE: Nanjing Institute of Geology and Paleontology, Nanjing 210008, China.. chenjy@jlonline.com
SOURCE: Proceedings of the National Academy of Sciences of the United States of America, (2000 Apr 25) 97 (9) 4457-62. Journal code: 7505876. ISSN: 0027-8424. (Investigators: Davidson E, CA Inst Tech, Pasadena)
PUB. COUNTRY: United States
DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals; Space Life Sciences
ENTRY MONTH: 200005
ENTRY DATE: Entered STN: 20000606
Last Updated on STN: 20020321
Entered Medline: 20000524

L3 ANSWER 10 OF 81 MEDLINE on STN
TI Scyphozoan jellyfish's mesoglea supports attachment, spreading and migration of anthozoans' cells in vitro.
AB Mechanically and enzymatically dissociated cells from five **anthozoan** species were laid on seven substrates in vitro. Cells were taken from two sea anemones (Aiptasia sp. and Anemonia sulcata), a scleractinian coral (Stylophora pistillata) and two alcyonacean corals (Heteroxenia fuscescence and Nephthea sp). Substrates tested: glass (coverslips), plastic (uncoated tissue culture plates), type IV collagen, gelatin, fibronectin, mesoglea pieces from the scyphozoan jellyfish Rhopilema nomadica and acetic acid extract of jellyfish mesoglea. Except for the mesoglea pieces, cells did not respond to any one of the other substrates, retaining their rounded shape. Following contact with mesoglea pieces, cells attached and spread. Subsequently they migrated into the mesogleal matrix at a rate of 5-10 microm/h during the first 2-5 h. No difference was found between the behavior of cells from the five different **cnidarian** species.

ACCESSION NUMBER: 2000069155 MEDLINE
DOCUMENT NUMBER: PubMed ID: 10600239
TITLE: Scyphozoan jellyfish's mesoglea supports attachment, spreading and migration of anthozoans' cells in vitro.
AUTHOR: Frank U; Rinkevich B

CORPORATE SOURCE: The National Institute of Oceanography, Israel
Oceanographic and Limnological Research, Haifa, 31080,
Israel.. frank@www.zoo.uni-heidelberg.de
SOURCE: Cell biology international, (1999) 23 (4) 307-11.
Journal code: 9307129. ISSN: 1065-6995.
PUB. COUNTRY: ENGLAND: United Kingdom
DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals
ENTRY MONTH: 200002
ENTRY DATE: Entered STN: 20000209
Last Updated on STN: 20000209
Entered Medline: 20000201

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(FILE 'HOME' ENTERED AT 16:11:28 ON 15 SEP 2004)

FILE 'MEDLINE, USPATFULL, DGENE, EMBASE, WPIDS, FSTA, CEN, CEABA-VTB, BIOSIS' ENTERED AT 16:12:03 ON 15 SEP 2004
L1 522 S ANTHOZOAN
L2 1784 S CNIDARIAN
L3 81 S L1 AND L2

=> s l2 and chromoprotein
L4 72 L2 AND CHROMOPROTEIN

=> s l4 and (non-bioluminescent)
L5 24 L4 AND (NON-BIOLUMINESCENT)

=> d l5 ti abs ibib tot

L5 ANSWER 1 OF 24 USPATFULL on STN
TI Kindling fluorescent proteins and methods for their use
AB Kindling fluorescent protein compositions and nucleic acids encoding the same, as well as methods for using the same, are provided. The kindling fluorescent proteins are characterized in that they become brightly fluorescent proteins, from an initial non-fluorescent or low fluorescent state, upon exposure to a kindling stimulus, which fluorescent state may be reversible or irreversible. The subject protein/nucleic acid compositions find use in labeling protocols, e.g., in labeling proteins, organelles, cells and organisms, etc., in a variety of different types of applications. Also provided are systems and kits for use in practicing such applications.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.
ACCESSION NUMBER: 2003:134795 USPATFULL
TITLE: Kindling fluorescent proteins and methods for their use
INVENTOR(S): Lukyanov, Sergey A., Moscow, RUSSIAN FEDERATION
Lukyanov, Konstantin, Moscow, RUSSIAN FEDERATION
Chudakov, Dmitry, Moscow, RUSSIAN FEDERATION

	NUMBER	KIND	DATE	
PATENT INFORMATION:	US 2003092884	A1	20030515	
APPLICATION INFO.:	US 2002-155809	A1	20020524	(10)

	NUMBER	DATE	
PRIORITY INFORMATION:	US 2001-293752P	20010525	(60)
	US 2001-329176P	20011011	(60)

DOCUMENT TYPE: Utility
FILE SEGMENT: APPLICATION

LEGAL REPRESENTATIVE: BOZICEVIC, FIELD & FRANCIS LLP, 200 MIDDLEFIELD RD, SUITE 200, MENLO PARK, CA, 94025
NUMBER OF CLAIMS: 43
EXEMPLARY CLAIM: 1
NUMBER OF DRAWINGS: 10 Drawing Page(s)
LINE COUNT: 3222
CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L5 ANSWER 2 OF 24 USPATFULL on STN
TI Non aggregating fluorescent proteins and methods for using the same
AB Nucleic acid compositions encoding non-aggregating chromo/fluoroproteins and mutants thereof, as well as the proteins encoded by the same, are provided. The proteins of interest are polypeptides that are non-aggregating colored and/or fluorescent proteins, where the the non-aggregating feature arises from the modulation of residues in the N-terminus of the protein and the chromo and/or fluorescent feature arises from the interaction of two or more residues of the protein. Also provided are fragments of the subject nucleic acids and the peptides encoded thereby, as well as antibodies to the subject proteins and transgenic cells and organisms. The subject protein and nucleic acid compositions find use in a variety of different applications. Finally, kits for use in such applications, e.g., that include the subject nucleic acid compositions, are provided.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.
ACCESSION NUMBER: 2003:30340 USPATFULL
TITLE: Non aggregating fluorescent proteins and methods for using the same
INVENTOR(S): Lukyanov, Sergey, Moscow, RUSSIAN FEDERATION
Lukyanov, Konstantin, Moscow, RUSSIAN FEDERATION
Yanushevich, Yuriy, Moscow, RUSSIAN FEDERATION
Savitsky, Alexandr, Moscow, RUSSIAN FEDERATION
Fradkov, Arcady, Moscow, RUSSIAN FEDERATION

	NUMBER	KIND	DATE
PATENT INFORMATION:	US 2003022287	A1	20030130
APPLICATION INFO.:	US 2002-81864	A1	20020220 (10)

RELATED APPLN. INFO.: Continuation-in-part of Ser. No. US 2001-6922, filed on 4 Dec 2001, PENDING

	NUMBER	DATE
PRIORITY INFORMATION:	US 2001-270983P	20010221 (60)

DOCUMENT TYPE: Utility
FILE SEGMENT: APPLICATION
LEGAL REPRESENTATIVE: BOZICEVIC, FIELD & FRANCIS LLP, 200 MIDDLEFIELD RD, SUITE 200, MENLO PARK, CA, 94025
NUMBER OF CLAIMS: 20
EXEMPLARY CLAIM: 1
NUMBER OF DRAWINGS: 15 Drawing Page(s)
LINE COUNT: 2207
CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L5 ANSWER 3 OF 24 USPATFULL on STN
TI Novel chromophores/fluorophores and methods for using the same
AB Nucleic acid compositions encoding novel chromo/fluoroproteins and mutants thereof, as well as the proteins encoded by the same, are provided. The subject proteins of interest are proteins that are colored and/or fluorescent, where this feature arises from the interaction of two or more residues of the protein. The subject proteins are further characterized in that they are either obtained from **non-bioluminescent Cnidarian**, e.g., Anthozoan, species or are obtained from non-Pennatulacean (sea pen) species. Specific proteins

of interest include proteins obtained from the following specific Anthozoan species: Anemonia majano (NFP-1), Clavularia sp. (NFP-2), Zoanthus sp. (NFP-3 & NFP-4), Discosoma striata (NFP-5), Discosoma sp. "red" (NFP-6), Anemonia sulcata (NFP-7), Discosoma sp "green" (NFP-8), and Discosoma sp. "magenta" (NFP-9). Also of interest are proteins that are substantially similar to, or mutants of, the above specific proteins. Also provided are fragments of the nucleic acids and the peptides encoded thereby, as well as antibodies to the subject proteins and transgenic cells and organisms. The subject protein and nucleic acid compositions find use in a variety of different applications. Finally, kits for use in such applications, e.g., that include the subject nucleic acid compositions, are provided.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

ACCESSION NUMBER: 2002:343950 USPATFULL

TITLE: Novel chromophores/fluorophores and methods for using the same

INVENTOR(S): Lukyanov, Sergey A., Moscow, RUSSIAN FEDERATION
Fradkov, Arcady F., Moscow, RUSSIAN FEDERATION
Labas, Yulii A., Moscow, RUSSIAN FEDERATION
Matz, Mikhail V., Palm Cost, RUSSIAN FEDERATION
Terskikh, Alexey, Palo Alto, CA, UNITED STATES

	NUMBER	KIND	DATE
PATENT INFORMATION:	US 2002197676	A1	20021226
APPLICATION INFO.:	US 2001-6922	A1	20011204 (10)

RELATED APPLN. INFO.: Continuation-in-part of Ser. No. WO 2000-US28477, filed on 13 Oct 2000, UNKNOWN Continuation-in-part of Ser. No. US 1999-418529, filed on 14 Oct 1999, PENDING Continuation-in-part of Ser. No. US 1999-418917, filed on 15 Oct 1999, ABANDONED Continuation-in-part of Ser. No. US 1999-418922, filed on 15 Oct 1999, ABANDONED Continuation-in-part of Ser. No. US 1999-444338, filed on 19 Nov 1999, ABANDONED Continuation-in-part of Ser. No. US 1999-444341, filed on 19 Nov 1999, ABANDONED Continuation-in-part of Ser. No. US 1999-457556, filed on 9 Dec 1999, ABANDONED Continuation-in-part of Ser. No. US 1999-458477, filed on 9 Dec 1999, ABANDONED Continuation-in-part of Ser. No. US 1999-458144, filed on 9 Dec 1999, ABANDONED Continuation-in-part of Ser. No. US 1999-457898, filed on 9 Dec 1999, ABANDONED

	NUMBER	DATE
PRIORITY INFORMATION:	WO 1999-US29405	19991210
	US 2000-211627P	20000614 (60)
	US 2000-211687P	20000614 (60)
	US 2000-211609P	20000614 (60)
	US 2000-211626P	20000614 (60)
	US 2000-211880P	20000614 (60)
	US 2000-211607P	20000614 (60)
	US 2000-211766P	20000614 (60)
	US 2000-211888P	20000614 (60)
	US 2000-212070P	20000614 (60)

DOCUMENT TYPE: Utility

FILE SEGMENT: APPLICATION

LEGAL REPRESENTATIVE: BOZICEVIC, FIELD & FRANCIS LLP, 200 MIDDLEFIELD RD, SUITE 200, MENLO PARK, CA, 94025

NUMBER OF CLAIMS: 31

EXEMPLARY CLAIM: 1

NUMBER OF DRAWINGS: 19 Drawing Page(s)

LINE COUNT: 2795

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L5 ANSWER 4 OF 24 DGENE COPYRIGHT 2004 THOMSON DERWENT on STN

TI Novel nucleic acid encoding interconverted mutant of chromo-or fluorescent protein which are useful as biosensors, coloring agents.

AN ADH34496 protein DGENE

AB The invention relates to interconverted mutants of chromoproteins (CP) or fluorescent proteins (FP) and nucleic acids encoding them. The mutant is derived from a Cnidnarian species, preferably a **non-bioluminescent Cnidarian** species, and most preferably an Anthozoan species. The invention is based on the finding that although green fluorecent protein (GFP)-like chromoproteins and fluorescent proteins exhibit some degree of homology, there are certain positions (referred to as 148, 165, 167 and 203; numbering corresponds to GFP) that are occupied by noticeably different residues in the two types of proteins. Mutagenesis of the residues in these key positions in, for example, a fluorescent protein, to those found in a **chromoprotein** is therefore proposed to confer **chromoprotein** activity on the fluorescent protein mutant, with chromoproteins being able to be converted into fluorescent proteins in a similar manner. The invention also relates to expression constructs, vectors, host cells and host cell progeny comprising a nucleic acid of the invention; the recombinant production of an interconverted **chromoprotein** or fluorescent protein mutant; and antibodies specific for interconverted mutant proteins of the invention. The interconverted mutants are useful in any application that employs a **chromoprotein** or fluorescent protein. Fluorecent protein mutants having **chromoprotein** activity can useful as colouring agents in, for example, food compositions, pharmaceuticals, cosmetics and living organisms. Proteins with **chromoprotein** activity are also useful as labels in biological analyte detection assays, as selectable markers in recombinant DNA applications (e.g. the production of transgenic cells and organisms), and are also useful as sunscreens and selective filters. **Chromoprotein** mutants having fluorecent protein activity useful in fluorescence resonance energy transfer (FRET) applications, as biosensors in prokaryotic and eukaryotic cells, as markers of whole cells to detect changes in multicellular reorganisation and migration, as second messenger detectors, as in vivo markers in animals (e.g., transgenic animals), in fluorescence activated cell sorting applications, in protease cleavage assays, and in assays to determine the phospholipid composition in biological membranes. Proteins with fluorescent protein activity can also be used as fluorescent timers, where the switch of one fluorescent colour to another (e.g., green to red) is concomitant with the ageing of the protein and is useful for determination of the activation or deactivation of gene expression. The present sequence represents an Anemonia sulcata purple **chromoprotein** asCP mutant generated in an example of the invention. The present sequence is not shown in the specification, but was derived from the wild-type asCP sequence (ADH34487) shown in Fig 1 and the information provided on page 43.

ACCESSION NUMBER: ADH34496 protein DGENE

TITLE: Novel nucleic acid encoding interconverted mutant of chromo-or fluorescent protein which are useful as biosensors, coloring agents.

INVENTOR: Bulina M E; Chudakov D; Lukyanov K A

PATENT ASSIGNEE: (CLON-N)CLONTECH LAB INC.

PATENT INFO: WO 2003057833 A2 20030717 56p

APPLICATION INFO: WO 2002-US41418 20021223

PRIORITY INFO: US 2001-343128P 20011226

DOCUMENT TYPE: Patent

LANGUAGE: English

OTHER SOURCE: 2003-607998 [57]

DESCRIPTION: Anemonia sulcata asCP mutant H203Q.

L5 ANSWER 5 OF 24 DGENE COPYRIGHT 2004 THOMSON DERWENT on STN

TI Novel nucleic acid encoding interconverted mutant of chromo-or fluorescent protein which are useful as biosensors, coloring agents.

AN ADH34504 protein DGENE

AB The invention relates to interconverted mutants of chromoproteins (CP) or fluorescent proteins (FP) and nucleic acids encoding them. The mutant is derived from a Cnidnarian species, preferably a **non-bioluminescent Cnidarian** species, and most preferably an Anthozoan species. The invention is based on the finding that although green fluorecent protein (GFP)-like chromoproteins and fluorescent proteins exhibit some degree of homology, there are certain positions (referred to as 148, 165, 167 and 203; numbering corresponds to GFP) that are occupied by noticeably different residues in the two types of proteins. Mutagenesis of the residues in these key positions in, for example, a fluorescent protein, to those found in a **chromoprotein** is therefore proposed to confer **chromoprotein** activity on the fluorescent protein mutant, with chromoproteins being able to be converted into fluorescent proteins in a similar manner. The invention also relates to expression constructs, vectors, host cells and host cell progeny comprising a nucleic acid of the invention; the recombinant production of an interconverted **chromoprotein** or fluorescent protein mutant; and antibodies specific for interconverted mutant proteins of the invention. The interconverted mutants are useful in any application that employs a **chromoprotein** or fluorescent protein. Fluorecent protein mutants having **chromoprotein** activity can useful as colouring agents in, for example, food compositions, pharmaceuticals, cosmetics and living organisms. Proteins with **chromoprotein** activity are also useful as labels in biological analyte detection assays, as selectable markers in recombinant DNA applications (e.g. the production of transgenic cells and organisms), and are also useful as sunscreens and selective filters. **Chromoprotein** mutants having fluorecent protein activity useful in fluorescence resonance energy transfer (FRET) applications, as biosensors in prokaryotic and eukaryotic cells, as markers of whole cells to detect changes in multicellular reorganisation and migration, as second messenger detectors, as in vivo markers in animals (e.g., transgenic animals), in fluorescence activated cell sorting applications, in protease cleavage assays, and in assays to determine the phospholipid composition in biological membranes. Proteins with fluorescent protein activity can also be used as fluorescent timers, where the switch of one fluorescent colour to another (e.g., green to red) is concomitant with the ageing of the protein and is useful for determination of the activation or deactivation of gene expression. The present sequence represents a Discosoma sp. red fluorescent protein DsRed mutant generated in an example of the invention. The present sequence is not shown in the specification, but was derived from the wild-type DsRed sequence (ADH34489) shown in Fig 1 and the information provided on page 42.

ACCESSION NUMBER: ADH34504 protein DGENE
TITLE: Novel nucleic acid encoding interconverted mutant of chromo-or fluorescent protein which are useful as biosensors, coloring agents.
INVENTOR: Bulina M E; Chudakov D; Lukyanov K A
PATENT ASSIGNEE: (CLON-N)CLONTECH LAB INC.
PATENT INFO: WO 2003057833 A2 20030717 56p
APPLICATION INFO: WO 2002-US41418 20021223
PRIORITY INFO: US 2001-343128P 20011226
DOCUMENT TYPE: Patent
LANGUAGE: English
OTHER SOURCE: 2003-607998 [57]
DESCRIPTION: Discosoma sp. DsRed mutant S148A/I165S/K167M/S203A.

L5 ANSWER 6 OF 24 DGENE COPYRIGHT 2004 THOMSON DERWENT on STN
TI Novel nucleic acid encoding interconverted mutant of chromo-or fluorescent protein which are useful as biosensors, coloring agents.

AN ADH34501 protein DGENE
AB The invention relates to interconverted mutants of chromoproteins (CP) or fluorescent proteins (FP) and nucleic acids encoding them. The mutant is derived from a Cnidnarian species, preferably a **non-bioluminescent Cnidarian** species, and most preferably an Anthozoan species. The invention is based on the finding that although green fluorecent protein (GFP)-like chromoproteins and fluorescent proteins exhibit some degree of homology, there are certain positions (referred to as 148, 165, 167 and 203; numbering corresponds to GFP) that are occupied by noticeably different residues in the two types of proteins. Mutagenesis of the residues in these key positions in, for example, a fluorescent protein, to those found in a **chromoprotein** is therefore proposed to confer **chromoprotein** activity on the fluorescent protein mutant, with chromoproteins being able to be converted into fluorescent proteins in a similar manner. The invention also relates to expression constructs, vectors, host cells and host cell progeny comprising a nucleic acid of the invention; the recombinant production of an interconverted **chromoprotein** or fluorescent protein mutant; and antibodies specific for interconverted mutant proteins of the invention. The interconverted mutants are useful in any application that employs a **chromoprotein** or fluorescent protein. Fluorecent protein mutants having **chromoprotein** activity can useful as colouring agents in, for example, food compositions, pharmaceuticals, cosmetics and living organisms. Proteins with **chromoprotein** activity are also useful as labels in biological analyte detection assays, as selectable markers in recombinant DNA applications (e.g. the production of transgenic cells and organisms), and are also useful as sunscreens and selective filters. **Chromoprotein** mutants having fluorecent protein activity useful in fluorescence resonance energy transfer (FRET) applications, as biosensors in prokaryotic and eukaryotic cells, as markers of whole cells to detect changes in multicellular reorganisation and migration, as second messenger detectors, as in vivo markers in animals (e.g., transgenic animals), in fluorescence activated cell sorting applications, in protease cleavage assays, and in assays to determine the phospholipid composition in biological membranes. Proteins with fluorescent protein activity can also be used as fluorescent timers, where the switch of one fluorescent colour to another (e.g., green to red) is concomitant with the ageing of the protein and is useful for determination of the activation or deactivation of gene expression. The present sequence represents a Discosoma sp. red fluorescent protein DsRed mutant generated in an example of the invention. The present sequence is not shown in the specification, but was derived from the wild-type DsRed sequence (ADH34489) shown in Fig 1 and the information provided on page 42.

ACCESSION NUMBER: ADH34501 protein DGENE
TITLE: Novel nucleic acid encoding interconverted mutant of chromo-or fluorescent protein which are useful as biosensors, coloring agents.
INVENTOR: Bulina M E; Chudakov D; Lukyanov K A
PATENT ASSIGNEE: (CLON-N)CLONTECH LAB INC.
PATENT INFO: WO 2003057833 A2 20030717 56p
APPLICATION INFO: WO 2002-US41418 20021223
PRIORITY INFO: US 2001-343128P 20011226
DOCUMENT TYPE: Patent
LANGUAGE: English
OTHER SOURCE: 2003-607998 [57]
DESCRIPTION: Discosoma sp. DsRed mutant S148A/K167M.

L5 ANSWER 7 OF 24 DGENE COPYRIGHT 2004 THOMSON DERWENT on STN
TI Novel nucleic acid encoding interconverted mutant of chromo-or fluorescent protein which are useful as biosensors, coloring agents.
AN ADH34491 protein DGENE
AB The invention relates to interconverted mutants of chromoproteins (CP) or

fluorescent proteins (FP) and nucleic acids encoding them. The mutant is derived from a Cnidnarian species, preferably a **non-bioluminescent Cnidarian** species, and most preferably an Anthozoan species. The invention is based on the finding that although green fluorecent protein (GFP)-like chromoproteins and fluorescent proteins exhibit some degree of homology, there are certain positions (referred to as 148, 165, 167 and 203; numbering corresponds to GFP) that are occupied by noticeably different residues in the two types of proteins. Mutagenesis of the residues in these key positions in, for example, a fluorescent protein, to those found in a **chromoprotein** is therefore proposed to confer **chromoprotein** activity on the fluorescent protein mutant, with chromoproteins being able to be converted into fluorescent proteins in a similar manner. The invention also relates to expression constructs, vectors, host cells and host cell progeny comprising a nucleic acid of the invention; the recombinant production of an interconverted **chromoprotein** or fluorescent protein mutant; and antibodies specific for interconverted mutant proteins of the invention. The interconverted mutants are useful in any application that employs a **chromoprotein** or fluorescent protein. Fluorecent protein mutants having **chromoprotein** activity can useful as colouring agents in, for example, food compositions, pharmaceuticals, cosmetics and living organisms. Proteins with **chromoprotein** activity are also useful as labels in biological analyte detection assays, as selectable markers in recombinant DNA applications (e.g. the production of transgenic cells and organisms), and are also useful as sunscreens and selective filters. **Chromoprotein** mutants having fluorecent protein activity useful in fluorescence resonance energy transfer (FRET) applications, as biosensors in prokaryotic and eukaryotic cells, as markers of whole cells to detect changes in multicellular reorganisation and migration, as second messenger detectors, as in vivo markers in animals (e.g., transgenic animals), in fluorescence activated cell sorting applications, in protease cleavage assays, and in assays to determine the phospholipid composition in biological membranes. Proteins with fluorescent protein activity can also be used as fluorescent timers, where the switch of one fluorescent colour to another (e.g., green to red) is concomitant with the ageing of the protein and is useful for determination of the activation or deactivation of gene expression. The present sequence represents an Anemonia sulcata purple **chromoprotein** asCP mutant generated in an example of the invention. The present sequence is not shown in the specification, but was derived from the wild-type asCP sequence (ADH34487) shown in Fig 1 and the information provided on page 42.

ACCESSION NUMBER: ADH34491 protein DGENE
TITLE: Novel nucleic acid encoding interconverted mutant of chromo-or fluorescent protein which are useful as biosensors, coloring agents.
INVENTOR: Bulina M E; Chudakov D; Lukyanov K A
PATENT ASSIGNEE: (CLON-N)CLONTECH LAB INC.
PATENT INFO: WO 2003057833 A2 20030717 56p
APPLICATION INFO: WO 2002-US41418 20021223
PRIORITY INFO: US 2001-343128P 20011226
DOCUMENT TYPE: Patent
LANGUAGE: English
OTHER SOURCE: 2003-607998 [57]
DESCRIPTION: Anemonia sulcata asCP mutant S165V.

L5 ANSWER 8 OF 24 DGENE COPYRIGHT 2004 THOMSON DERWENT on STN
TI Novel nucleic acid encoding interconverted mutant of chromo-or fluorescent protein which are useful as biosensors, coloring agents.
AN ADH34502 protein DGENE
AB The invention relates to interconverted mutants of chromoproteins (CP) or fluorescent proteins (FP) and nucleic acids encoding them. The mutant is derived from a Cnidnarian species, preferably a **non-**

bioluminescent Cnidarian species, and most preferably an Anthozoan species. The invention is based on the finding that although green fluorecent protein (GFP)-like chromoproteins and fluorescent proteins exhibit some degree of homology, there are certain positions (referred to as 148, 165, 167 and 203; numbering corresponds to GFP) that are occupied by noticeably different residues in the two types of proteins. Mutagenesis of the residues in these key positions in, for example, a fluorescent protein, to those found in a **chromoprotein** is therefore proposed to confer **chromoprotein** activity on the fluorescent protein mutant, with chromoproteins being able to be converted into fluorescent proteins in a similar manner. The invention also relates to expression constructs, vectors, host cells and host cell progeny comprising a nucleic acid of the invention; the recombinant production of an interconverted **chromoprotein** or fluorescent protein mutant; and antibodies specific for interconverted mutant proteins of the invention. The interconverted mutants are useful in any application that employs a **chromoprotein** or fluorescent protein. Fluorecent protein mutants having **chromoprotein** activity can useful as colouring agents in, for example, food compositions, pharmaceuticals, cosmetics and living organisms. Proteins with **chromoprotein** activity are also useful as labels in biological analyte detection assays, as selectable markers in recombinant DNA applications (e.g. the production of transgenic cells and organisms), and are also useful as sunscreens and selective filters. **Chromoprotein** mutants having fluorecent protein activity useful in fluorescence resonance energy transfer (FRET) applications, as biosensors in prokaryotic and eukaryotic cells, as markers of whole cells to detect changes in multicellular reorganisation and migration, as second messenger detectors, as in vivo markers in animals (e.g., transgenic animals), in fluorescence activated cell sorting applications, in protease cleavage assays, and in assays to determine the phospholipid composition in biological membranes. Proteins with fluorescent protein activity can also be used as fluorescent timers, where the switch of one fluorescent colour to another (e.g., green to red) is concomitant with the ageing of the protein and is useful for determination of the activation or deactivation of gene expression. The present sequence represents a Discosoma sp. red fluorescent protein DsRed mutant generated in an example of the invention. The present sequence is not shown in the specification, but was derived from the wild-type DsRed sequence (ADH34489) shown in Fig 1 and the information provided on page 42.

ACCESSION NUMBER: ADH34502 protein DGENE
TITLE: Novel nucleic acid encoding interconverted mutant of chromo-or fluorescent protein which are useful as biosensors, coloring agents.
INVENTOR: Bulina M E; Chudakov D; Lukyanov K A
PATENT ASSIGNEE: (CLON-N)CLONTECH LAB INC.
PATENT INFO: WO 2003057833 A2 20030717 56p
APPLICATION INFO: WO 2002-US41418 20021223
PRIORITY INFO: US 2001-343128P 20011226
DOCUMENT TYPE: Patent
LANGUAGE: English
OTHER SOURCE: 2003-607998 [57]
DESCRIPTION: Discosoma sp. DsRed mutant S148A/K167M/S203A.

L5 ANSWER 9 OF 24 DGENE COPYRIGHT 2004 THOMSON DERWENT on STN
TI Novel nucleic acid encoding interconverted mutant of chromo-or fluorescent protein which are useful as biosensors, coloring agents.
AN ADH34494 protein DGENE
AB The invention relates to interconverted mutants of chromoproteins (CP) or fluorescent proteins (FP) and nucleic acids encoding them. The mutant is derived from a Cnidnarian species, preferably a **non-bioluminescent Cnidarian** species, and most preferably an Anthozoan species. The invention is based on the finding that

although green fluorecent protein (GFP)-like chromoproteins and fluorescent proteins exhibit some degree of homology, there are certain positions (referred to as 148, 165, 167 and 203; numbering corresponds to GFP) that are occupied by noticeably different residues in the two types of proteins. Mutagenesis of the residues in these key positions in, for example, a fluorescent protein, to those found in a **chromoprotein** is therefore proposed to confer **chromoprotein** activity on the fluorescent protein mutant, with chromoproteins being able to be converted into fluorescent proteins in a similar manner. The invention also relates to expression constructs, vectors, host cells and host cell progeny comprising a nucleic acid of the invention; the recombinant production of an interconverted **chromoprotein** or fluorescent protein mutant; and antibodies specific for interconverted mutant proteins of the invention. The interconverted mutants are useful in any application that employs a **chromoprotein** or fluorescent protein. Fluorecent protein mutants having **chromoprotein** activity can useful as colouring agents in, for example, food compositions, pharmaceuticals, cosmetics and living organisms. Proteins with **chromoprotein** activity are also useful as labels in biological analyte detection assays, as selectable markers in recombinant DNA applications (e.g. the production of transgenic cells and organisms), and are also useful as sunscreens and selective filters. **Chromoprotein** mutants having fluorecent protein activity useful in fluorescence resonance energy transfer (FRET) applications, as biosensors in prokaryotic and eukaryotic cells, as markers of whole cells to detect changes in multicellular reorganisation and migration, as second messenger detectors, as in vivo markers in animals (e.g., transgenic animals), in fluorescence activated cell sorting applications, in protease cleavage assays, and in assays to determine the phospholipid composition in biological membranes. Proteins with fluorescent protein activity can also be used as fluorescent timers, where the switch of one fluorescent colour to another (e.g., green to red) is concomitant with the ageing of the protein and is useful for determination of the activation or deactivation of gene expression. The present sequence represents an Anemonia sulcata purple **chromoprotein** asCP mutant generated in an example of the invention. The present sequence is not shown in the specification, but was derived from the wild-type asCP sequence (ADH34487) shown in Fig 1 and the information provided on page 43.

ACCESSION NUMBER: ADH34494 protein DGENE
TITLE: Novel nucleic acid encoding interconverted mutant of chromo-or fluorescent protein which are useful as biosensors, coloring agents.
INVENTOR: Bulina M E; Chudakov D; Lukyanov K A
PATENT ASSIGNEE: (CLON-N) CLONTECH LAB INC.
PATENT INFO: WO 2003057833 A2 20030717 56p
APPLICATION INFO: WO 2002-US41418 20021223
PRIORITY INFO: US 2001-343128P 20011226
DOCUMENT TYPE: Patent
LANGUAGE: English
OTHER SOURCE: 2003-607998 [57]
DESCRIPTION: Anemonia sulcata asCP mutant H176R/K219I.

L5 ANSWER 10 OF 24 DGENE COPYRIGHT 2004 THOMSON DERWENT on STN
TI Novel nucleic acid encoding interconverted mutant of chromo-or fluorescent protein which are useful as biosensors, coloring agents.
AN ADH34503 protein DGENE
AB The invention relates to interconverted mutants of chromoproteins (CP) or fluorescent proteins (FP) and nucleic acids encoding them. The mutant is derived from a Cnidnarian species, preferably a **non-bioluminescent Cnidarian** species, and most preferably an Anthozoan species. The invention is based on the finding that although green fluorecent protein (GFP)-like chromoproteins and fluorescent proteins exhibit some degree of homology, there are certain

positions (referred to as 148, 165, 167 and 203; numbering corresponds to GFP) that are occupied by noticeably different residues in the two types of proteins. Mutagenesis of the residues in these key positions in, for example, a fluorescent protein, to those found in a **chromoprotein** is therefore proposed to confer **chromoprotein** activity on the fluorescent protein mutant, with chromoproteins being able to be converted into fluorescent proteins in a similar manner. The invention also relates to expression constructs, vectors, host cells and host cell progeny comprising a nucleic acid of the invention; the recombinant production of an interconverted **chromoprotein** or fluorescent protein mutant; and antibodies specific for interconverted mutant proteins of the invention. The interconverted mutants are useful in any application that employs a **chromoprotein** or fluorescent protein. Fluorecent protein mutants having **chromoprotein** activity can useful as colouring agents in, for example, food compositions, pharmaceuticals, cosmetics and living organisms. Proteins with **chromoprotein** activity are also useful as labels in biological analyte detection assays, as selectable markers in recombinant DNA applications (e.g. the production of transgenic cells and organisms), and are also useful as sunscreens and selective filters. **Chromoprotein** mutants having fluorecent protein activity useful in fluorescence resonance energy transfer (FRET) applications, as biosensors in prokaryotic and eukaryotic cells, as markers of whole cells to detect changes in multicellular reorganisation and migration, as second messenger detectors, as in vivo markers in animals (e.g., transgenic animals), in fluorescence activated cell sorting applications, in protease cleavage assays, and in assays to determine the phospholipid composition in biological membranes. Proteins with fluorescent protein activity can also be used as fluorescent timers, where the switch of one fluorescent colour to another (e.g., green to red) is concomitant with the ageing of the protein and is useful for determination of the activation or deactivation of gene expression. The present sequence represents a Discosoma sp. red fluorescent protein DsRed mutant generated in an example of the invention. The present sequence is not shown in the specification, but was derived from the wild-type DsRed sequence (ADH34489) shown in Fig 1 and the information provided on page 42.

ACCESSION NUMBER: ADH34503 protein DGENE
TITLE: Novel nucleic acid encoding interconverted mutant of chromo-or fluorescent protein which are useful as biosensors, coloring agents.
INVENTOR: Bulina M E; Chudakov D; Lukyanov K A
PATENT ASSIGNEE: (CLON-N)CLONTECH LAB INC.
PATENT INFO: WO 2003057833 A2 20030717 56p
APPLICATION INFO: WO 2002-US41418 20021223
PRIORITY INFO: US 2001-343128P 20011226
DOCUMENT TYPE: Patent
LANGUAGE: English
OTHER SOURCE: 2003-607998 [57]
DESCRIPTION: Discosoma sp. DsRed mutant S148A/I165S/S203A.

L5 ANSWER 11 OF 24 DGENE COPYRIGHT 2004 THOMSON DERWENT on STN
TI Novel nucleic acid encoding interconverted mutant of chromo-or fluorescent protein which are useful as biosensors, coloring agents.
AN ADH34497 protein DGENE
AB The invention relates to interconverted mutants of chromoproteins (CP) or fluorescent proteins (FP) and nucleic acids encoding them. The mutant is derived from a Cnidnarian species, preferably a **non-bioluminescent Cnidarian** species, and most preferably an Anthozoan species. The invention is based on the finding that although green fluorecent protein (GFP)-like chromoproteins and fluorescent proteins exhibit some degree of homology, there are certain positions (referred to as 148, 165, 167 and 203; numbering corresponds to GFP) that are occupied by noticeably different residues in the two

types of proteins. Mutagenesis of the residues in these key positions in, for example, a fluorescent protein, to those found in a **chromoprotein** is therefore proposed to confer **chromoprotein** activity on the fluorescent protein mutant, with chromoproteins being able to be converted into fluorescent proteins in a similar manner. The invention also relates to expression constructs, vectors, host cells and host cell progeny comprising a nucleic acid of the invention; the recombinant production of an interconverted **chromoprotein** or fluorescent protein mutant; and antibodies specific for interconverted mutant proteins of the invention. The interconverted mutants are useful in any application that employs a **chromoprotein** or fluorescent protein. Fluorecent protein mutants having **chromoprotein** activity can useful as colouring agents in, for example, food compositions, pharmaceuticals, cosmetics and living organisms. Proteins with **chromoprotein** activity are also useful as labels in biological analyte detection assays, as selectable markers in recombinant DNA applications (e.g. the production of transgenic cells and organisms), and are also useful as sunscreens and selective filters. **Chromoprotein** mutants having fluorecent protein activity useful in fluorescence resonance energy transfer (FRET) applications, as biosensors in prokaryotic and eukaryotic cells, as markers of whole cells to detect changes in multicellular reorganisation and migration, as second messenger detectors, as in vivo markers in animals (e.g., transgenic animals), in fluorescence activated cell sorting applications, in protease cleavage assays, and in assays to determine the phospholipid composition in biological membranes. Proteins with fluorescent protein activity can also be used as fluorescent timers, where the switch of one fluorescent colour to another (e.g., green to red) is concomitant with the ageing of the protein and is useful for determination of the activation or deactivation of gene expression. The present sequence represents an Anemonia sulcata purple **chromoprotein** asCP mutant generated in an example of the invention. The present sequence is not shown in the specification, but was derived from the wild-type asCP sequence (ADH34487) shown in Fig 1 and the information provided on page 43.

ACCESSION NUMBER: ADH34497 protein DGENE
TITLE: Novel nucleic acid encoding interconverted mutant of chromo-or fluorescent protein which are useful as biosensors, coloring agents.
INVENTOR: Bulina M E; Chudakov D; Lukyanov K A
PATENT ASSIGNEE: (CLON-N) CLONTECH LAB INC.
PATENT INFO: WO 2003057833 A2 20030717 56p
APPLICATION INFO: WO 2002-US41418 20021223
PRIORITY INFO: US 2001-343128P 20011226
DOCUMENT TYPE: Patent
LANGUAGE: English
OTHER SOURCE: 2003-607998 [57]
DESCRIPTION: Anemonia sulcata asCP mutant Q220L.

L5 ANSWER 12 OF 24 DGENE COPYRIGHT 2004 THOMSON DERWENT on STN
TI Novel nucleic acid encoding interconverted mutant of chromo-or fluorescent protein which are useful as biosensors, coloring agents.
AN ADH34492 protein DGENE
AB The invention relates to interconverted mutants of chromoproteins (CP) or fluorescent proteins (FP) and nucleic acids encoding them. The mutant is derived from a Cnidnarian species, preferably a **non-bioluminescent Cnidarian** species, and most preferably an Anthozoan species. The invention is based on the finding that although green fluorecent protein (GFP)-like chromoproteins and fluorescent proteins exhibit some degree of homology, there are certain positions (referred to as 148, 165, 167 and 203; numbering corresponds to GFP) that are occupied by noticeably different residues in the two types of proteins. Mutagenesis of the residues in these key positions in, for example, a fluorescent protein, to those found in a

chromoprotein is therefore proposed to confer **chromoprotein** activity on the fluorescent protein mutant, with chromoproteins being able to be converted into fluorescent proteins in a similar manner. The invention also relates to expression constructs, vectors, host cells and host cell progeny comprising a nucleic acid of the invention; the recombinant production of an interconverted **chromoprotein** or fluorescent protein mutant; and antibodies specific for interconverted mutant proteins of the invention. The interconverted mutants are useful in any application that employs a **chromoprotein** or fluorescent protein. Fluorecent protein mutants having **chromoprotein** activity can useful as colouring agents in, for example, food compositions, pharmaceuticals, cosmetics and living organisms. Proteins with **chromoprotein** activity are also useful as labels in biological analyte detection assays, as selectable markers in recombinant DNA applications (e.g. the production of transgenic cells and organisms), and are also useful as sunscreens and selective filters. **Chromoprotein** mutants having fluorecent protein activity useful in fluorescence resonance energy transfer (FRET) applications, as biosensors in prokaryotic and eukaryotic cells, as markers of whole cells to detect changes in multicellular reorganisation and migration, as second messenger detectors, as in vivo markers in animals (e.g., transgenic animals), in fluorescence activated cell sorting applications, in protease cleavage assays, and in assays to determine the phospholipid composition in biological membranes. Proteins with fluorescent protein activity can also be used as fluorescent timers, where the switch of one fluorescent colour to another (e.g., green to red) is concomitant with the ageing of the protein and is useful for determination of the activation or deactivation of gene expression. The present sequence represents an Anemonia sulcata purple **chromoprotein** asCP mutant generated in an example of the invention. The present sequence is not shown in the specification, but was derived from the wild-type asCP sequence (ADH34487) shown in Fig 1 and the information provided on page 43.

ACCESSION NUMBER: ADH34492 protein DGENE
TITLE: Novel nucleic acid encoding interconverted mutant of chromo-or fluorescent protein which are useful as biosensors, coloring agents.
INVENTOR: Bulina M E; Chudakov D; Lukyanov K A
PATENT ASSIGNEE: (CLON-N)CLONTECH LAB INC.
PATENT INFO: WO 2003057833 A2 20030717 56p
APPLICATION INFO: WO 2002-US41418 20021223
PRIORITY INFO: US 2001-343128P 20011226
DOCUMENT TYPE: Patent
LANGUAGE: English
OTHER SOURCE: 2003-607998 [57]
DESCRIPTION: Anemonia sulcata asCP mutant S68G.

L5 ANSWER 13 OF 24 DGENE COPYRIGHT 2004 THOMSON DERWENT on STN
TI Novel nucleic acid encoding interconverted mutant of chromo-or fluorescent protein which are useful as biosensors, coloring agents.
AN ADH34500 protein DGENE
AB The invention relates to interconverted mutants of chromoproteins (CP) or fluorescent proteins (FP) and nucleic acids encoding them. The mutant is derived from a Cnidnarian species, preferably a **non-bioluminescent Cnidarian** species, and most preferably an Anthozoan species. The invention is based on the finding that although green fluorecent protein (GFP)-like chromoproteins and fluorescent proteins exhibit some degree of homology, there are certain positions (referred to as 148, 165, 167 and 203; numbering corresponds to GFP) that are occupied by noticeably different residues in the two types of proteins. Mutagenesis of the residues in these key positions in, for example, a fluorescent protein, to those found in a **chromoprotein** is therefore proposed to confer **chromoprotein** activity on the fluorescent protein mutant, with

chromoproteins being able to be converted into fluorescent proteins in a similar manner. The invention also relates to expression constructs, vectors, host cells and host cell progeny comprising a nucleic acid of the invention; the recombinant production of an interconverted **chromoprotein** or fluorescent protein mutant; and antibodies specific for interconverted mutant proteins of the invention. The interconverted mutants are useful in any application that employs a **chromoprotein** or fluorescent protein. Fluorecent protein mutants having **chromoprotein** activity can useful as colouring agents in, for example, food compositions, pharmaceuticals, cosmetics and living organisms. Proteins with **chromoprotein** activity are also useful as labels in biological analyte detection assays, as selectable markers in recombinant DNA applications (e.g. the production of transgenic cells and organisms), and are also useful as sunscreens and selective filters. **Chromoprotein** mutants having fluorecent protein activity useful in fluorescence resonance energy transfer (FRET) applications, as biosensors in prokaryotic and eukaryotic cells, as markers of whole cells to detect changes in multicellular reorganisation and migration, as second messenger detectors, as in vivo markers in animals (e.g., transgenic animals), in fluorescence activated cell sorting applications, in protease cleavage assays, and in assays to determine the phospholipid composition in biological membranes. Proteins with fluorescent protein activity can also be used as fluorescent timers, where the switch of one fluorescent colour to another (e.g., green to red) is concomitant with the ageing of the protein and is useful for determination of the activation or deactivation of gene expression. The present sequence represents a Discosoma sp. red fluorescent protein DsRed mutant generated in an example of the invention. The present sequence is not shown in the specification, but was derived from the wild-type DsRed sequence (ADH34489) shown in Fig 1 and the information provided on page 42.

ACCESSION NUMBER: ADH34500 protein DGENE
TITLE: Novel nucleic acid encoding interconverted mutant of chromo-or fluorescent protein which are useful as biosensors, coloring agents.
INVENTOR: Bulina M E; Chudakov D; Lukyanov K A
PATENT ASSIGNEE: (CLON-N) CLONTECH LAB INC.
PATENT INFO: WO 2003057833 A2 20030717 56p
APPLICATION INFO: WO 2002-US41418 20021223
PRIORITY INFO: US 2001-343128P 20011226
DOCUMENT TYPE: Patent
LANGUAGE: English
OTHER SOURCE: 2003-607998 [57]
DESCRIPTION: Discosoma sp. DsRed mutant S148A/S203A.

L5 ANSWER 14 OF 24 DGENE COPYRIGHT 2004 THOMSON DERWENT on STN
TI Novel nucleic acid encoding interconverted mutant of chromo-or fluorescent protein which are useful as biosensors, coloring agents.
AN ADH34505 protein DGENE
AB The invention relates to interconverted mutants of chromoproteins (CP) or fluorescent proteins (FP) and nucleic acids encoding them. The mutant is derived from a Cnidnarian species, preferably a **non-bioluminescent Cnidarian** species, and most preferably an Anthozoan species. The invention is based on the finding that although green fluorecent protein (GFP)-like chromoproteins and fluorescent proteins exhibit some degree of homology, there are certain positions (referred to as 148, 165, 167 and 203; numbering corresponds to GFP) that are occupied by noticeably different residues in the two types of proteins. Mutagenesis of the residues in these key positions in, for example, a fluorescent protein, to those found in a **chromoprotein** is therefore proposed to confer **chromoprotein** activity on the fluorescent protein mutant, with chromoproteins being able to be converted into fluorescent proteins in a similar manner. The invention also relates to expression constructs,

vectors, host cells and host cell progeny comprising a nucleic acid of the invention; the recombinant production of an interconverted **chromoprotein** or fluorescent protein mutant; and antibodies specific for interconverted mutant proteins of the invention. The interconverted mutants are useful in any application that employs a **chromoprotein** or fluorescent protein. Fluorecent protein mutants having **chromoprotein** activity can useful as colouring agents in, for example, food compositions, pharmaceuticals, cosmetics and living organisms. Proteins with **chromoprotein** activity are also useful as labels in biological analyte detection assays, as selectable markers in recombinant DNA applications (e.g. the production of transgenic cells and organisms), and are also useful as sunscreens and selective filters. **Chromoprotein** mutants having fluorecent protein activity useful in fluorescence resonance energy transfer (FRET) applications, as biosensors in prokaryotic and eukaryotic cells, as markers of whole cells to detect changes in multicellular reorganisation and migration, as second messenger detectors, as in vivo markers in animals (e.g., transgenic animals), in fluorescence activated cell sorting applications, in protease cleavage assays, and in assays to determine the phospholipid composition in biological membranes. Proteins with fluorescent protein activity can also be used as fluorescent timers, where the switch of one fluorescent colour to another (e.g., green to red) is concomitant with the ageing of the protein and is useful for determination of the activation or deactivation of gene expression. The present sequence represents a Discosoma sp. red fluorescent protein DsRed mutant generated in an example of the invention. The present sequence is not shown in the specification, but was derived from the wild-type DsRed sequence (ADH34489) shown in Fig 1 and the information provided on page 42.

ACCESSION NUMBER: ADH34505 protein DGENE
TITLE: Novel nucleic acid encoding interconverted mutant of chromo-or fluorescent protein which are useful as biosensors, coloring agents.
INVENTOR: Bulina M E; Chudakov D; Lukyanov K A
PATENT ASSIGNEE: (CLON-N)CLONTECH LAB INC.
PATENT INFO: WO 2003057833 A2 20030717 56p
APPLICATION INFO: WO 2002-US41418 20021223
PRIORITY INFO: US 2001-343128P 20011226
DOCUMENT TYPE: Patent
LANGUAGE: English
OTHER SOURCE: 2003-607998 [57]
DESCRIPTION: Discosoma sp. DsRed mutant S148C/I165N/S203A.

L5 ANSWER 15 OF 24 DGENE COPYRIGHT 2004 THOMSON DERWENT on STN
TI Novel nucleic acid encoding interconverted mutant of chromo-or fluorescent protein which are useful as biosensors, coloring agents.
AN ADH34499 protein DGENE
AB The invention relates to interconverted mutants of chromoproteins (CP) or fluorescent proteins (FP) and nucleic acids encoding them. The mutant is derived from a Cnidnarian species, preferably a **non-bioluminescent Cnidarian** species, and most preferably an Anthozoan species. The invention is based on the finding that although green fluorecent protein (GFP)-like chromoproteins and fluorescent proteins exhibit some degree of homology, there are certain positions (referred to as 148, 165, 167 and 203; numbering corresponds to GFP) that are occupied by noticeably different residues in the two types of proteins. Mutagenesis of the residues in these key positions in, for example, a fluorescent protein, to those found in a **chromoprotein** is therefore proposed to confer **chromoprotein** activity on the fluorescent protein mutant, with chromoproteins being able to be converted into fluorescent proteins in a similar manner. The invention also relates to expression constructs, vectors, host cells and host cell progeny comprising a nucleic acid of the invention; the recombinant production of an interconverted

chromoprotein or fluorescent protein mutant; and antibodies specific for interconverted mutant proteins of the invention. The interconverted mutants are useful in any application that employs a **chromoprotein** or fluorescent protein. Fluorecent protein mutants having **chromoprotein** activity can useful as colouring agents in, for example, food compositions, pharmaceuticals, cosmetics and living organisms. Proteins with **chromoprotein** activity are also useful as labels in biological analyte detection assays, as selectable markers in recombinant DNA applications (e.g. the production of transgenic cells and organisms), and are also useful as sunscreens and selective filters. **Chromoprotein** mutants having fluorecent protein activity useful in fluorescence resonance energy transfer (FRET) applications, as biosensors in prokaryotic and eukaryotic cells, as markers of whole cells to detect changes in multicellular reorganisation and migration, as second messenger detectors, as in vivo markers in animals (e.g., transgenic animals), in fluorescence activated cell sorting applications, in protease cleavage assays, and in assays to determine the phospholipid composition in biological membranes. Proteins with fluorescent protein activity can also be used as fluorescent timers, where the switch of one fluorescent colour to another (e.g., green to red) is concomitant with the ageing of the protein and is useful for determination of the activation or deactivation of gene expression. The present sequence represents a Discosoma sp. red fluorescent protein DsRed mutant generated in an example of the invention. The present sequence is not shown in the specification, but was derived from the wild-type DsRed sequence (ADH34489) shown in Fig 1 and the information provided on page 42.

ACCESSION NUMBER: ADH34499 protein DGENE
TITLE: Novel nucleic acid encoding interconverted mutant of chromo-or fluorescent protein which are useful as biosensors, coloring agents.
INVENTOR: Bulina M E; Chudakov D; Lukyanov K A
PATENT ASSIGNEE: (CLON-N)CLONTECH LAB INC.
PATENT INFO: WO 2003057833 A2 20030717 56p
APPLICATION INFO: WO 2002-US41418 20021223
PRIORITY INFO: US 2001-343128P 20011226
DOCUMENT TYPE: Patent
LANGUAGE: English
OTHER SOURCE: 2003-607998 [57]
DESCRIPTION: Discosoma sp. DsRed mutant S203A.

L5 ANSWER 16 OF 24 DGENE COPYRIGHT 2004 THOMSON DERWENT on STN
TI Novel nucleic acid encoding interconverted mutant of chromo-or fluorescent protein which are useful as biosensors, coloring agents.
AN ADH34498 protein DGENE
AB The invention relates to interconverted mutants of chromoproteins (CP) or fluorescent proteins (FP) and nucleic acids encoding them. The mutant is derived from a Cnidnarian species, preferably a **non-bioluminescent Cnidarian** species, and most preferably an Anthozoan species. The invention is based on the finding that although green fluorecent protein (GFP)-like chromoproteins and fluorescent proteins exhibit some degree of homology, there are certain positions (referred to as 148, 165, 167 and 203; numbering corresponds to GFP) that are occupied by noticeably different residues in the two types of proteins. Mutagenesis of the residues in these key positions in, for example, a fluorescent protein, to those found in a **chromoprotein** is therefore proposed to confer **chromoprotein** activity on the fluorescent protein mutant, with chromoproteins being able to be converted into fluorescent proteins in a similar manner. The invention also relates to expression constructs, vectors, host cells and host cell progeny comprising a nucleic acid of the invention; the recombinant production of an interconverted **chromoprotein** or fluorescent protein mutant; and antibodies specific for interconverted mutant proteins of the invention. The

interconverted mutants are useful in any application that employs a **chromoprotein** or fluorescent protein. Fluorecent protein mutants having **chromoprotein** activity can useful as colouring agents in, for example, food compositions, pharmaceuticals, cosmetics and living organisms. Proteins with **chromoprotein** activity are also useful as labels in biological analyte detection assays, as selectable markers in recombinant DNA applications (e.g. the production of transgenic cells and organisms), and are also useful as sunscreens and selective filters. **Chromoprotein** mutants having fluorecent protein activity useful in fluorescence resonance energy transfer (FRET) applications, as biosensors in prokaryotic and eukaryotic cells, as markers of whole cells to detect changes in multicellular reorganisation and migration, as second messenger detectors, as in vivo markers in animals (e.g., transgenic animals), in fluorescence activated cell sorting applications, in protease cleavage assays, and in assays to determine the phospholipid composition in biological membranes. Proteins with fluorescent protein activity can also be used as fluorescent timers, where the switch of one fluorescent colour to another (e.g., green to red) is concomitant with the ageing of the protein and is useful for determination of the activation or deactivation of gene expression. The present sequence represents a Discosoma sp. red fluorescent protein DsRed mutant generated in an example of the invention. The present sequence is not shown in the specification, but was derived from the wild-type DsRed sequence (ADH34489) shown in Fig 1 and the information provided on page 42.

ACCESSION NUMBER: ADH34498 protein DGENE
TITLE: Novel nucleic acid encoding interconverted mutant of chromo-or fluorescent protein which are useful as biosensors, coloring agents.
INVENTOR: Bulina M E; Chudakov D; Lukyanov K A
PATENT ASSIGNEE: (CLON-N)CLONTECH LAB INC.
PATENT INFO: WO 2003057833 A2 20030717 56p
APPLICATION INFO: WO 2002-US41418 20021223
PRIORITY INFO: US 2001-343128P 20011226
DOCUMENT TYPE: Patent
LANGUAGE: English
OTHER SOURCE: 2003-607998 [57]
DESCRIPTION: Discosoma sp. DsRed mutant S148A.

L5 ANSWER 17 OF 24 DGENE COPYRIGHT 2004 THOMSON DERWENT on STN
TI Novel nucleic acid encoding interconverted mutant of chromo-or fluorescent protein which are useful as biosensors, coloring agents.
AN ADH34490 protein DGENE
AB The invention relates to interconverted mutants of chromoproteins (CP) or fluorescent proteins (FP) and nucleic acids encoding them. The mutant is derived from a Cnidnarian species, preferably a **non-bioluminescent Cnidarian** species, and most preferably an Anthozoan species. The invention is based on the finding that although green fluorecent protein (GFP)-like chromoproteins and fluorescent proteins exhibit some degree of homology, there are certain positions (referred to as 148, 165, 167 and 203; numbering corresponds to GFP) that are occupied by noticeably different residues in the two types of proteins. Mutagenesis of the residues in these key positions in, for example, a fluorescent protein, to those found in a **chromoprotein** is therefore proposed to confer **chromoprotein** activity on the fluorescent protein mutant, with chromoproteins being able to be converted into fluorescent proteins in a similar manner. The invention also relates to expression constructs, vectors, host cells and host cell progeny comprising a nucleic acid of the invention; the recombinant production of an interconverted **chromoprotein** or fluorescent protein mutant; and antibodies specific for interconverted mutant proteins of the invention. The interconverted mutants are useful in any application that employs a **chromoprotein** or fluorescent protein. Fluorecent protein mutants

having **chromoprotein** activity can useful as colouring agents in, for example, food compositions, pharmaceuticals, cosmetics and living organisms. Proteins with **chromoprotein** activity are also useful as labels in biological analyte detection assays, as selectable markers in recombinant DNA applications (e.g. the production of transgenic cells and organisms), and are also useful as sunscreens and selective filters. **Chromoprotein** mutants having fluorecent protein activity useful in fluorescence resonance energy transfer (FRET) applications, as biosensors in prokaryotic and eukaryotic cells, as markers of whole cells to detect changes in multicellular reorganisation and migration, as second messenger detectors, as in vivo markers in animals (e.g., transgenic animals), in fluorescence activated cell sorting applications, in protease cleavage assays, and in assays to determine the phospholipid composition in biological membranes. Proteins with fluorescent protein activity can also be used as fluorescent timers, where the switch of one fluorescent colour to another (e.g., green to red) is concomitant with the ageing of the protein and is useful for determination of the activation or deactivation of gene expression. The present sequence represents an Anemonia sulcata purple **chromoprotein** asCP mutant generated in an example of the invention. The present sequence is not shown in the specification, but was derived from the wild-type asCP sequence (ADH34487) shown in Fig 1 and the information provided on page 42.

ACCESSION NUMBER: ADH34490 protein DGENE
TITLE: Novel nucleic acid encoding interconverted mutant of chromo-or fluorescent protein which are useful as biosensors, coloring agents.
INVENTOR: Bulina M E; Chudakov D; Lukyanov K A
PATENT ASSIGNEE: (CLON-N)CLONTECH LAB INC.
PATENT INFO: WO 2003057833 A2 20030717 56p
APPLICATION INFO: WO 2002-US41418 20021223
PRIORITY INFO: US 2001-343128P 20011226
DOCUMENT TYPE: Patent
LANGUAGE: English
OTHER SOURCE: 2003-607998 [57]
DESCRIPTION: Anemonia sulcata asCP mutant A148S.

L5 ANSWER 18 OF 24 DGENE COPYRIGHT 2004 THOMSON DERWENT on STN
TI Novel nucleic acid encoding interconverted mutant of chromo-or fluorescent protein which are useful as biosensors, coloring agents.
AN ADH34489 protein DGENE
AB The invention relates to interconverted mutants of chromoproteins (CP) or fluorescent proteins (FP) and nucleic acids encoding them. The mutant is derived from a Cnidnarian species, preferably a **non-bioluminescent Cnidarian** species, and most preferably an Anthozoan species. The invention is based on the finding that although green fluorecent protein (GFP)-like chromoproteins and fluorescent proteins exhibit some degree of homology, there are certain positions (referred to as 148, 165, 167 and 203; numbering corresponds to GFP) that are occupied by noticeably different residues in the two types of proteins. Mutagenesis of the residues in these key positions in, for example, a fluorescent protein, to those found in a **chromoprotein** is therefore proposed to confer **chromoprotein** activity on the fluorescent protein mutant, with chromoproteins being able to be converted into fluorescent proteins in a similar manner. The invention also relates to expression constructs, vectors, host cells and host cell progeny comprising a nucleic acid of the invention; the recombinant production of an interconverted **chromoprotein** or fluorescent protein mutant; and antibodies specific for interconverted mutant proteins of the invention. The interconverted mutants are useful in any application that employs a **chromoprotein** or fluorescent protein. Fluorecent protein mutants having **chromoprotein** activity can useful as colouring agents in, for example, food compositions, pharmaceuticals, cosmetics and

living organisms. Proteins with **chromoprotein** activity are also useful as labels in biological analyte detection assays, as selectable markers in recombinant DNA applications (e.g. the production of transgenic cells and organisms), and are also useful as sunscreens and selective filters. **Chromoprotein** mutants having fluorecent protein activity useful in fluorescence resonance energy transfer (FRET) applications, as biosensors in prokaryotic and eukaryotic cells, as markers of whole cells to detect changes in multicellular reorganisation and migration, as second messenger detectors, as in vivo markers in animals (e.g., transgenic animals), in fluorescence activated cell sorting applications, in protease cleavage assays, and in assays to determine the phospholipid composition in biological membranes. Proteins with fluorescent protein activity can also be used as fluorescent timers, where the switch of one fluorescent colour to another (e.g., green to red) is concomitant with the ageing of the protein and is useful for determination of the activation or deactivation of gene expression. The present sequence represents a wild-type red fluorescent protein, DsRed, from Discosoma sp. that was used as a parent sequence for the generation of mutant proteins in an example of the invention.

ACCESSION NUMBER: ADH34489 protein DGENE
TITLE: Novel nucleic acid encoding interconverted mutant of chromo-or fluorescent protein which are useful as biosensors, coloring agents.
INVENTOR: Bulina M E; Chudakov D; Lukyanov K A
PATENT ASSIGNEE: (CLON-N)CLONTECH LAB INC.
PATENT INFO: WO 2003057833 A2 20030717 56p
APPLICATION INFO: WO 2002-US41418 20021223
PRIORITY INFO: US 2001-343128P 20011226
DOCUMENT TYPE: Patent
LANGUAGE: English
OTHER SOURCE: 2003-607998 [57]
DESCRIPTION: Discosoma sp. red fluorescent protein DsRed (wild-type).

L5 ANSWER 19 OF 24 DGENE COPYRIGHT 2004 THOMSON DERWENT on STN
TI Novel nucleic acid encoding interconverted mutant of chromo-or fluorescent protein which are useful as biosensors, coloring agents.
AN ADH34488 protein DGENE
AB The invention relates to interconverted mutants of chromoproteins (CP) or fluorescent proteins (FP) and nucleic acids encoding them. The mutant is derived from a Cnidnarian species, preferably a **non-bioluminescent Cnidarian** species, and most preferably an Anthozoan species. The invention is based on the finding that although green fluorecent protein (GFP)-like chromoproteins and fluorescent proteins exhibit some degree of homology, there are certain positions (referred to as 148, 165, 167 and 203; numbering corresponds to GFP) that are occupied by noticeably different residues in the two types of proteins. Mutagenesis of the residues in these key positions in, for example, a fluorescent protein, to those found in a **chromoprotein** is therefore proposed to confer **chromoprotein** activity on the fluorescent protein mutant, with chromoproteins being able to be converted into fluorescent proteins in a similar manner. The invention also relates to expression constructs, vectors, host cells and host cell progeny comprising a nucleic acid of the invention; the recombinant production of an interconverted **chromoprotein** or fluorescent protein mutant; and antibodies specific for interconverted mutant proteins of the invention. The interconverted mutants are useful in any application that employs a **chromoprotein** or fluorescent protein. Fluorecent protein mutants having **chromoprotein** activity can useful as colouring agents in, for example, food compositions, pharmaceuticals, cosmetics and living organisms. Proteins with **chromoprotein** activity are also useful as labels in biological analyte detection assays, as selectable markers in recombinant DNA applications (e.g. the production of transgenic cells and organisms), and are also useful as sunscreens and

selective filters. **Chromoprotein** mutants having fluorecent protein activity useful in fluorescence resonance energy transfer (FRET) applications, as biosensors in prokaryotic and eukaryotic cells, as markers of whole cells to detect changes in multicellular reorganisation and migration, as second messenger detectors, as in vivo markers in animals (e.g., transgenic animals), in fluorescence activated cell sorting applications, in protease cleavage assays, and in assays to determine the phospholipid composition in biological membranes. Proteins with fluorescent protein activity can also be used as fluorescent timers, where the switch of one fluorescent colour to another (e.g., green to red) is concomitant with the ageing of the protein and is useful for determination of the activation or deactivation of gene expression. The present sequence represents green fluorescent protein (GFP) from the jellyfish Aequorea victoria.

ACCESSION NUMBER: ADH34488 protein DGENE
TITLE: Novel nucleic acid encoding interconverted mutant of chromo-or fluorescent protein which are useful as biosensors, coloring agents.
INVENTOR: Bulina M E; Chudakov D; Lukyanov K A
PATENT ASSIGNEE: (CLON-N)CLONTECH LAB INC.
PATENT INFO: WO 2003057833 A2 20030717 56p
APPLICATION INFO: WO 2002-US41418 20021223
PRIORITY INFO: US 2001-343128P 20011226
DOCUMENT TYPE: Patent
LANGUAGE: English
OTHER SOURCE: 2003-607998 [57]
DESCRIPTION: Aequorea victoria green fluorescent protein (GFP).

L5 ANSWER 20 OF 24 DGENE COPYRIGHT 2004 THOMSON DERWENT on STN
TI Novel nucleic acid encoding interconverted mutant of chromo-or fluorescent protein which are useful as biosensors, coloring agents.
AN ADH34506 protein DGENE
AB The invention relates to interconverted mutants of chromoproteins (CP) or fluorescent proteins (FP) and nucleic acids encoding them. The mutant is derived from a Cnidnarian species, preferably a **non-bioluminescent Cnidarian** species, and most preferably an Anthozoan species. The invention is based on the finding that although green fluorecent protein (GFP)-like chromoproteins and fluorescent proteins exhibit some degree of homology, there are certain positions (referred to as 148, 165, 167 and 203; numbering corresponds to GFP) that are occupied by noticeably different residues in the two types of proteins. Mutagenesis of the residues in these key positions in, for example, a fluorescent protein, to those found in a **chromoprotein** is therefore proposed to confer **chromoprotein** activity on the fluorescent protein mutant, with chromoproteins being able to be converted into fluorescent proteins in a similar manner. The invention also relates to expression constructs, vectors, host cells and host cell progeny comprising a nucleic acid of the invention; the recombinant production of an interconverted **chromoprotein** or fluorescent protein mutant; and antibodies specific for interconverted mutant proteins of the invention. The interconverted mutants are useful in any application that employs a **chromoprotein** or fluorescent protein. Fluorecent protein mutants having **chromoprotein** activity can useful as colouring agents in, for example, food compositions, pharmaceuticals, cosmetics and living organisms. Proteins with **chromoprotein** activity are also useful as labels in biological analyte detection assays, as selectable markers in recombinant DNA applications (e.g. the production of transgenic cells and organisms), and are also useful as sunscreens and selective filters. **Chromoprotein** mutants having fluorecent protein activity useful in fluorescence resonance energy transfer (FRET) applications, as biosensors in prokaryotic and eukaryotic cells, as markers of whole cells to detect changes in multicellular reorganisation and migration, as second messenger detectors, as in vivo markers in

animals (e.g., transgenic animals), in fluorescence activated cell sorting applications, in protease cleavage assays, and in assays to determine the phospholipid composition in biological membranes. Proteins with fluorescent protein activity can also be used as fluorescent timers, where the switch of one fluorescent colour to another (e.g., green to red) is concomitant with the ageing of the protein and is useful for determination of the activation or deactivation of gene expression. The present sequence represents a non-fluorescent Discosoma sp. red fluorescent protein DsRed mutant, DsRed-NF, which has **chromoprotein** activity and which was generated in an example of the invention. The present sequence is not shown in the specification, but was derived from the wild-type DsRed sequence (ADH34489) shown in Fig 1 and the information provided on page 42.

ACCESSION NUMBER: ADH34506 protein DGENE
TITLE: Novel nucleic acid encoding interconverted mutant of chromo-or fluorescent protein which are useful as biosensors, coloring agents.
INVENTOR: Bulina M E; Chudakov D; Lukyanov K A
PATENT ASSIGNEE: (CLON-N)CLONTECH LAB INC.
PATENT INFO: WO 2003057833 A2 20030717 56p
APPLICATION INFO: WO 2002-US41418 20021223
PRIORITY INFO: US 2001-343128P 20011226
DOCUMENT TYPE: Patent
LANGUAGE: English
OTHER SOURCE: 2003-607998 [57]
DESCRIPTION: Discosoma sp. DsRed mutant DsRed-NF S148C/I165N/K167M/S203A.

L5 ANSWER 21 OF 24 DGENE COPYRIGHT 2004 THOMSON DERWENT on STN
TI Novel nucleic acid encoding interconverted mutant of chromo-or fluorescent protein which are useful as biosensors, coloring agents.
AN ADH34487 protein DGENE
AB The invention relates to interconverted mutants of chromoproteins (CP) or fluorescent proteins (FP) and nucleic acids encoding them. The mutant is derived from a Cnidnarian species, preferably a **non-bioluminescent Cnidarian** species, and most preferably an Anthozoan species. The invention is based on the finding that although green fluorecent protein (GFP)-like chromoproteins and fluorescent proteins exhibit some degree of homology, there are certain positions (referred to as 148, 165, 167 and 203; numbering corresponds to GFP) that are occupied by noticeably different residues in the two types of proteins. Mutagenesis of the residues in these key positions in, for example, a fluorescent protein, to those found in a **chromoprotein** is therefore proposed to confer **chromoprotein** activity on the fluorescent protein mutant, with chromoproteins being able to be converted into fluorescent proteins in a similar manner. The invention also relates to expression constructs, vectors, host cells and host cell progeny comprising a nucleic acid of the invention; the recombinant production of an interconverted **chromoprotein** or fluorescent protein mutant; and antibodies specific for interconverted mutant proteins of the invention. The interconverted mutants are useful in any application that employs a **chromoprotein** or fluorescent protein. Fluorecent protein mutants having **chromoprotein** activity can useful as colouring agents in, for example, food compositions, pharmaceuticals, cosmetics and living organisms. Proteins with **chromoprotein** activity are also useful as labels in biological analyte detection assays, as selectable markers in recombinant DNA applications (e.g. the production of transgenic cells and organisms), and are also useful as sunscreens and selective filters. **Chromoprotein** mutants having fluorecent protein activity useful in fluorescence resonance energy transfer (FRET) applications, as biosensors in prokaryotic and eukaryotic cells, as markers of whole cells to detect changes in multicellular reorganisation and migration, as second messenger detectors, as in vivo markers in animals (e.g., transgenic animals), in fluorescence activated cell

sorting applications, in protease cleavage assays, and in assays to determine the phospholipid composition in biological membranes. Proteins with fluorescent protein activity can also be used as fluorescent timers, where the switch of one fluorescent colour to another (e.g., green to red) is concomitant with the ageing of the protein and is useful for determination of the activation or deactivation of gene expression. The present sequence represents a wild-type purple **chromoprotein**, asCP, from the snake-locks sea anemone Anemonia sulcata that was used as a parent sequence for the generation of mutant proteins in an example of the invention.

ACCESSION NUMBER: ADH34487 protein DGENE
TITLE: Novel nucleic acid encoding interconverted mutant of chromo-or fluorescent protein which are useful as biosensors, coloring agents.
INVENTOR: Bulina M E; Chudakov D; Lukyanov K A
PATENT ASSIGNEE: (CLON-N)CLONTECH LAB INC.
PATENT INFO: WO 2003057833 A2 20030717 56p
APPLICATION INFO: WO 2002-US41418 20021223
PRIORITY INFO: US 2001-343128P 20011226
DOCUMENT TYPE: Patent
LANGUAGE: English
OTHER SOURCE: 2003-607998 [57]
DESCRIPTION: Anemonia sulcata purple **chromoprotein** asCP (wild-type).

L5 ANSWER 22 OF 24 DGENE COPYRIGHT 2004 THOMSON DERWENT on STN
TI Novel nucleic acid encoding interconverted mutant of chromo-or fluorescent protein which are useful as biosensors, coloring agents.
AN ADH34495 protein DGENE
AB The invention relates to interconverted mutants of chromoproteins (CP) or fluorescent proteins (FP) and nucleic acids encoding them. The mutant is derived from a Cnidnarian species, preferably a **non-bioluminescent Cnidarian** species, and most preferably an Anthozoan species. The invention is based on the finding that although green fluorecent protein (GFP)-like chromoproteins and fluorescent proteins exhibit some degree of homology, there are certain positions (referred to as 148, 165, 167 and 203; numbering corresponds to GFP) that are occupied by noticeably different residues in the two types of proteins. Mutagenesis of the residues in these key positions in, for example, a fluorescent protein, to those found in a **chromoprotein** is therefore proposed to confer **chromoprotein** activity on the fluorescent protein mutant, with chromoproteins being able to be converted into fluorescent proteins in a similar manner. The invention also relates to expression constructs, vectors, host cells and host cell progeny comprising a nucleic acid of the invention; the recombinant production of an interconverted **chromoprotein** or fluorescent protein mutant; and antibodies specific for interconverted mutant proteins of the invention. The interconverted mutants are useful in any application that employs a **chromoprotein** or fluorescent protein. Fluorecent protein mutants having **chromoprotein** activity can useful as colouring agents in, for example, food compositions, pharmaceuticals, cosmetics and living organisms. Proteins with **chromoprotein** activity are also useful as labels in biological analyte detection assays, as selectable markers in recombinant DNA applications (e.g. the production of transgenic cells and organisms), and are also useful as sunscreens and selective filters. **Chromoprotein** mutants having fluorecent protein activity useful in fluorescence resonance energy transfer (FRET) applications, as biosensors in prokaryotic and eukaryotic cells, as markers of whole cells to detect changes in multicellular reorganisation and migration, as second messenger detectors, as in vivo markers in animals (e.g., transgenic animals), in fluorescence activated cell sorting applications, in protease cleavage assays, and in assays to determine the phospholipid composition in biological membranes. Proteins

with fluorescent protein activity can also be used as fluorescent timers, where the switch of one fluorescent colour to another (e.g., green to red) is concomitant with the ageing of the protein and is useful for determination of the activation or deactivation of gene expression. The present sequence represents an Anemonia sulcata purple **chromoprotein** asCP mutant generated in an example of the invention. The present sequence is not shown in the specification, but was derived from the wild-type asCP sequence (ADH34487) shown in Fig 1 and the information provided on page 43.

ACCESSION NUMBER: ADH34495 protein DGENE
TITLE: Novel nucleic acid encoding interconverted mutant of chromo-or fluorescent protein which are useful as biosensors, coloring agents.
INVENTOR: Bulina M E; Chudakov D; Lukyanov K A
PATENT ASSIGNEE: (CLON-N)CLONTECH LAB INC.
PATENT INFO: WO 2003057833 A2 20030717 56p
APPLICATION INFO: WO 2002-US41418 20021223
PRIORITY INFO: US 2001-343128P 20011226
DOCUMENT TYPE: Patent
LANGUAGE: English
OTHER SOURCE: 2003-607998 [57]
DESCRIPTION: Anemonia sulcata asCP mutant H203R.

L5 ANSWER 23 OF 24 DGENE COPYRIGHT 2004 THOMSON DERWENT on STN
TI Novel nucleic acid encoding interconverted mutant of chromo-or fluorescent protein which are useful as biosensors, coloring agents.
AN ADH34493 protein DGENE
AB The invention relates to interconverted mutants of chromoproteins (CP) or fluorescent proteins (FP) and nucleic acids encoding them. The mutant is derived from a Cnidnarian species, preferably a **non-bioluminescent Cnidarian** species, and most preferably an Anthozoan species. The invention is based on the finding that although green fluorecent protein (GFP)-like chromoproteins and fluorescent proteins exhibit some degree of homology, there are certain positions (referred to as 148, 165, 167 and 203; numbering corresponds to GFP) that are occupied by noticeably different residues in the two types of proteins. Mutagenesis of the residues in these key positions in, for example, a fluorescent protein, to those found in a **chromoprotein** is therefore proposed to confer **chromoprotein** activity on the fluorescent protein mutant, with chromoproteins being able to be converted into fluorescent proteins in a similar manner. The invention also relates to expression constructs, vectors, host cells and host cell progeny comprising a nucleic acid of the invention; the recombinant production of an interconverted **chromoprotein** or fluorescent protein mutant; and antibodies specific for interconverted mutant proteins of the invention. The interconverted mutants are useful in any application that employs a **chromoprotein** or fluorescent protein. Fluorecent protein mutants having **chromoprotein** activity can useful as colouring agents in, for example, food compositions, pharmaceuticals, cosmetics and living organisms. Proteins with **chromoprotein** activity are also useful as labels in biological analyte detection assays, as selectable markers in recombinant DNA applications (e.g. the production of transgenic cells and organisms), and are also useful as sunscreens and selective filters. **Chromoprotein** mutants having fluorecent protein activity useful in fluorescence resonance energy transfer (FRET) applications, as biosensors in prokaryotic and eukaryotic cells, as markers of whole cells to detect changes in multicellular reorganisation and migration, as second messenger detectors, as in vivo markers in animals (e.g., transgenic animals), in fluorescence activated cell sorting applications, in protease cleavage assays, and in assays to determine the phospholipid composition in biological membranes. Proteins with fluorescent protein activity can also be used as fluorescent timers, where the switch of one fluorescent colour to another (e.g.,

green to red) is concomitant with the ageing of the protein and is useful for determination of the activation or deactivation of gene expression. The present sequence represents an Anemonia sulcata purple **chromoprotein** asCP mutant generated in an example of the invention. The present sequence is not shown in the specification, but was derived from the wild-type asCP sequence (ADH34487) shown in Fig 1 and the information provided on page 43.

ACCESSION NUMBER: ADH34493 protein DGENE
TITLE: Novel nucleic acid encoding interconverted mutant of chromo-or fluorescent protein which are useful as biosensors, coloring agents.
INVENTOR: Bulina M E; Chudakov D; Lukyanov K A
PATENT ASSIGNEE: (CLON-N)CLONTECH LAB INC.
PATENT INFO: WO 2003057833 A2 20030717 56p
APPLICATION INFO: WO 2002-US41418 20021223
PRIORITY INFO: US 2001-343128P 20011226
DOCUMENT TYPE: Patent
LANGUAGE: English
OTHER SOURCE: 2003-607998 [57]
DESCRIPTION: Anemonia sulcata asCP mutant I72N.

L5 ANSWER 24 OF 24 WPIDS COPYRIGHT 2004 THOMSON DERWENT on STN
TI Novel nucleic acid encoding interconverted mutant of chromo-or fluorescent protein which are useful as biosensors, coloring agents.
AN 2003-607998 [57] WPIDS
AB WO2003057833 A UPAB: 20030906
NOVELTY - Nucleic acid encoding an interconverted mutant (I) of a chromo- or fluorescent protein, is new.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for:
(1) a fragment of a nucleic acid encoding (I);
(2) a construct comprising a vector and a nucleic acid encoding (I);
(3) an expression cassette (II) comprises, a transcriptional initiation region that is functional in an expression host, a nucleic acid encoding (I) and a transcriptional termination region functional in the expression host;
(4) a cell or its progeny comprising (II), as part of an extrachromosomal element or integrated into the genome of a host cell as a result of introduction of (II) into the host cell;
(5) producing a chromo and/or fluorescent protein, comprises, growing the cell where protein is expressed and isolating the protein substantially free of other proteins;
(6) a protein (III) or its fragment encoded by the nucleic acid encoding (I) and an antibody binding specifically to the (III);
(7) transgenic cell or its progeny comprises a transgene which is a nucleic acid encoding (I);
(8) a kit comprising a nucleic acid encoding (I);
(9) preparation (M1) of nucleic acid encoding (I); and
(10) a nucleic acid produced by (M1).

USE - Nucleic acid encoding (I) is useful in any application that employs a chromo- or fluorescent protein. (III) is useful in any application that employs a chromo- or fluorescent protein (claimed). Nucleic acid encoding (I) is useful in the generation of transgenic, non-human plants or animals or site specific gene modification in cell lines. **Chromoprotein** encoded by the nucleic acid is useful as coloring agents which are capable of imparting color or pigment to a particular composition of matter e.g. food compositions, pharmaceuticals, cosmetics, living organisms, etc. The **chromoprotein** is also useful as labels in biological analyte detection assays and as selectable markers in recombinant DNA applications (e.g. the production of transgenic cells and organisms) and is also useful as sunscreens, selective filters, etc. The fluorescent protein encoded by the nucleic acid, is useful in fluorescence resonance energy transfer (FRET) applications and also useful as biosensors in prokaryotic and eukaryotic cells e.g. as Ca2+ ion indicator and as marker of whole cells to detect changes in multicellular

reorganization and migration. The fluorescent proteins are also useful as second messenger detector, e.g. by fusing the subject proteins to specific domains (Protein Kinase C gamma calcium binding domain) and as in vivo marker in animals (e.g. transgenic animals). The fluorescent proteins are also useful in fluorescence activated cell sorting application, in protease cleavage assays and in assays to determine the phospholipid composition in biological membranes. The fluorescent protein is a fluorescent timer, where the switch of one fluorescent color to another (e.g. green to red) concomitant with the aging of fluorescent protein, is used to determine the activation or deactivation of gene expression.

DESCRIPTION OF DRAWING(S) - The figure shows the normalized spectra for selected mutants of asCP and DsRed.

Dwg.3/3

ACCESSION NUMBER: 2003-607998 [57] WPIDS
DOC. NO. CPI: C2003-165725
TITLE: Novel nucleic acid encoding interconverted mutant of chromo-or fluorescent protein which are useful as biosensors, coloring agents.
DERWENT CLASS: B04 D16
INVENTOR(S): BULINA, M E; CHUDAKOV, D; LUKYANOV, K A
PATENT ASSIGNEE(S): (CLON-N) CLONTECH LAB INC
COUNTRY COUNT: 101
PATENT INFORMATION:

PATENT NO	KIND	DATE	WEEK	LA	PG
WO 2003057833	A2	20030717	(200357)*	EN	56
RW: AT BE BG CH CY CZ DE DK EA EE ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ NL OA PT SD SE SK SL SZ TR TZ UG ZM ZW					
W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ OM PH PL PT RO RU SC SD SE SG SK SL TJ TM TN TR TT TZ UA UG US UZ VC VN YU ZA ZM ZW					
AU 2002367391	A1	20030724	(200421)		

APPLICATION DETAILS:

PATENT NO	KIND	APPLICATION	DATE
WO 2003057833	A2	WO 2002-US41418	20021223
AU 2002367391	A1	AU 2002-367391	20021223

FILING DETAILS:

PATENT NO	KIND	PATENT NO
AU 2002367391	A1 Based on	WO 2003057833

PRIORITY APPLN. INFO: US 2001-343128P 20011226

=> d his

(FILE 'HOME' ENTERED AT 16:11:28 ON 15 SEP 2004)

FILE 'MEDLINE, USPATFULL, DGENE, EMBASE, WPIDS, FSTA, CEN, CEABA-VTB, BIOSIS' ENTERED AT 16:12:03 ON 15 SEP 2004

L1 522 S ANTHOZOAN
L2 1784 S CNIDARIAN
L3 81 S L1 AND L2
L4 72 S L2 AND CHROMOPROTEIN
L5 24 S L4 AND (NON-BIOLUMINESCENT)

```
=> s l5 and l1
L6          24 L5 AND L1

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E1           6     LUKYANOV YU V/AU
E2           5     LUKYANOV Z H V/AU
E3           0 --> LUKYANOV,S/AU
E4           1     LUKYANOVA A A/AU
E5           2     LUKYANOVA A M/AU
E6           2     LUKYANOVA A S/AU
E7           1     LUKYANOVA C N/AU
E8           2     LUKYANOVA E/AU
E9          13     LUKYANOVA E A/AU
E10          7     LUKYANOVA E G/AU
E11          1     LUKYANOVA E L/AU
E12         10     LUKYANOVA E M/AU

=> e yanushevich, y/au
E1           3     YANUSHEVICH YURIY/AU
E2           3     YANUSHEVICH Z V/AU
E3           0 --> YANUSHEVICH, Y/AU
E4           2     YANUSHEVICHUTE R P/AU
E5           3     YANUSHEVICHYUTE R P/AU
E6           1     YANUSHEVS KA E B/AU
E7           1     YANUSHEVS O A/AU
E8           1     YANUSHEVSK A I/AU
E9           1     YANUSHEVSK A J/AU
E10          2     YANUSHEVSK A T/AU
E11          3     YANUSHEVSK I A/AU
E12          1     YANUSHEVSK I V/AU

=> s e1
L7           3 "YANUSHEVICH YURIY"/AU

=> d l7 ti abs ibib tot

L7   ANSWER 1 OF 3  USPATFULL on STN
TI     Non aggregating fluorescent proteins and methods for using the same
AB     Nucleic acid compositions encoding non-aggregating chromo/fluoroproteins
       and mutants thereof, as well as the proteins encoded by the same, are
       provided. The proteins of interest are polypeptides that are
       non-aggregating colored and/or fluorescent proteins, where the the
       non-aggregating feature arises from the modulation of residues in the
       N-terminus of the protein and the chromo and/or fluorescent feature
       arises from the interaction of two or more residues of the protein. Also
       provided are fragments of the subject nucleic acids and the peptides
       encoded thereby, as well as antibodies to the subject proteins and
       transgenic cells and organisms. The subject protein and nucleic acid
       compositions find use in a variety of different applications. Finally,
       kits for use in such applications, e.g., that include the subject
       nucleic acid compositions, are provided.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.
ACCESSION NUMBER:       2003:30340  USPATFULL
TITLE:                  Non aggregating fluorescent proteins and methods for
                        using the same
INVENTOR(S):            Lukyanov, Sergey, Moscow, RUSSIAN FEDERATION
                        Lukyanov, Konstantin, Moscow, RUSSIAN FEDERATION
                          Yanushevich, Yuriy, Moscow, RUSSIAN
                        FEDERATION
                        Savitsky, Alexandr, Moscow, RUSSIAN FEDERATION
                        Fradkov, Arcady, Moscow, RUSSIAN FEDERATION

                             NUMBER       KIND    DATE
```

PATENT INFORMATION:	US 2003022287	A1	20030130
APPLICATION INFO.:	US 2002-81864	A1	20020220 (10)

RELATED APPLN. INFO.: Continuation-in-part of Ser. No. US 2001-6922, filed on 4 Dec 2001, PENDING

	NUMBER	DATE
PRIORITY INFORMATION:	US 2001-270983P	20010221 (60)

DOCUMENT TYPE: Utility
FILE SEGMENT: APPLICATION
LEGAL REPRESENTATIVE: BOZICEVIC, FIELD & FRANCIS LLP, 200 MIDDLEFIELD RD, SUITE 200, MENLO PARK, CA, 94025
NUMBER OF CLAIMS: 20
EXEMPLARY CLAIM: 1
NUMBER OF DRAWINGS: 15 Drawing Page(s)
LINE COUNT: 2207
CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L7 ANSWER 2 OF 3 BIOSIS COPYRIGHT (c) 2004 The Thomson Corporation. on STN
TI A novel group IIA phospholipase A2 interacts with v-Src oncoprotein from RSV-transformed hamster cells.
AB We have isolated a novel isoform of phospholipase A2. This enzyme was designated srPLA2 because it was discovered while analyzing the proteins interacting with different forms of the v-Src oncoproteins isolated from Rous sarcoma virus-transformed hamster cells. It contains all the functional regions of the PLA2 group IIA proteins but differs at its C-terminal end where there is an additional stretch of 8 amino acids. The SrPLA2 isoform was detected as a 17-kDa precursor in cells and as a mature 14-kDa form secreted in culture medium. A direct interaction of the 17-kDa precursor with the Src protein was observed in lysates of transformed cells. Both the 17- and 14-kDa forms were found to be phosphorylated on tyrosine. To our knowledge, this is the first report of a PLA2 group II protein that is tyrosine phosphorylated. We surmise that srPLA2 interacts with the Src protein at the cell membrane during the process of its maturation.
ACCESSION NUMBER: 2001:473102 BIOSIS
DOCUMENT NUMBER: PREV200100473102
TITLE: A novel group IIA phospholipase A2 interacts with v-Src oncoprotein from RSV-transformed hamster cells.
AUTHOR(S): Mizenina, Olga; Musatkina, Elena; **Yanushevich, Yuriy**; Rodina, Anna; Krasilnikov, Michail; de Gunzburg, Jean; Camonis, Jacques H.; Tavitian, Armand; Tatosyan, Alexander [Reprint author]
CORPORATE SOURCE: Cancer Research Center, Oncogene Regulation Laboratory Inst. of Carcinogenesis, Kashirskoye shosse, 24, 115478, Moscow, Russia
tatosyan@space.ru
SOURCE: Journal of Biological Chemistry, (September 7, 2001) Vol. 276, No. 36, pp. 34006-34012. print.
CODEN: JBCHA3. ISSN: 0021-9258.
DOCUMENT TYPE: Article
LANGUAGE: English
ENTRY DATE: Entered STN: 10 Oct 2001
Last Updated on STN: 23 Feb 2002

L7 ANSWER 3 OF 3 BIOSIS COPYRIGHT (c) 2004 The Thomson Corporation. on STN
TI C-terminal end of v-src protein interacts with peptide coded by gadd7/adapt15-like RNA in two-hybrid system.
AB The significant differences in the metastatic properties of hamster fibroblasts transformed by the Rous sarcoma virus (RSV) were associated with mutations in the v-src carboxy-terminal region. To identify the capacity of this region for protein-protein interaction the two-hybrid system was used. The cDNA clone (vseap1), producing the protein

specifically bound with the v-src C-terminal part in yeast cells in vivo and in GST-fusion system in vitro was isolated. Vseap1 shared 68% of homology with stressful agents induced RNA-gadd7/adapt15. Two vseap1 specific messenger RNAs were identified: 0.9-kbp RNA expressed in all transformed cells and three times less in embryo fibroblasts; 3.1-kbp transcript was deleted in the cells with suppressed v-src activity and H2O2 resistance.

ACCESSION NUMBER: 1998:120882 BIOSIS
DOCUMENT NUMBER: PREV199800120882
TITLE: C-terminal end of v-src protein interacts with peptide coded by gadd7/adapt15-like RNA in two-hybrid system.
AUTHOR(S): Mizenina, Olga; **Yanushevich, Yuriy**; Musatkina, Elena; Rodina, Anna; Camonis, Jacques; Tavitian, Armand [Reprint author]; Tatosyan, Alexander
CORPORATE SOURCE: INSERM U248, Inst. Curie, 28 rue d'Ulm, 75248 Paris Cedex 05, France
SOURCE: FEBS Letters, (Jan. 23, 1998) Vol. 422, No. 1, pp. 79-84. print.
CODEN: FEBLAL. ISSN: 0014-5793.
DOCUMENT TYPE: Article
LANGUAGE: English
OTHER SOURCE: EMBL-AJ003192
ENTRY DATE: Entered STN: 5 Mar 1998
Last Updated on STN: 5 Mar 1998

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=> d his

     (FILE 'HOME' ENTERED AT 16:11:28 ON 15 SEP 2004)

     FILE 'MEDLINE, USPATFULL, DGENE, EMBASE, WPIDS, FSTA, CEN, CEABA-VTB,
     BIOSIS' ENTERED AT 16:12:03 ON 15 SEP 2004
L1           522 S ANTHOZOAN
L2          1784 S CNIDARIAN
L3            81 S L1 AND L2
L4            72 S L2 AND CHROMOPROTEIN
L5            24 S L4 AND (NON-BIOLUMINESCENT)
L6            24 S L5 AND L1
                 E LUKYANOV,S/AU
                 E YANUSHEVICH, Y/AU
L7             3 S E1

=> e savitsky, a/au
E1             4     SAVITSKY YU S/AU
E2             1     SAVITSKY YU V/AU
E3             0 --> SAVITSKY, A/AU
E4             1     SAVITSKYAY A A/AU
E5             3     SAVITSKYI G A/AU
E6             1     SAVITSKYI V N/AU
E7             1     SAVITSYN Y U P/AU
E8             1     SAVITT A/AU
E9             1     SAVITT A E/AU
E10            1     SAVITT A G/AU
E11            1     SAVITT A J/AU
E12            2     SAVITT ANN/AU

=> e fradkov, a/au
E1             1     FRADKOV V YU/AU
E2             2     FRADKOV Y U Z/AU
E3             0 --> FRADKOV, A/AU
E4             2     FRADKOVA G A/AU
E5             7     FRADKOVA G V/AU
E6             1     FRADKOVA L/AU
E7            50     FRADKOVA T A/AU
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E8            4      FRADL D/AU
E9           10      FRADL D C/AU
E10           8      FRADL F/AU
E11           1      FRADL FREDY/AU
E12           1      FRADL G G/AU

=> d his

     (FILE 'HOME' ENTERED AT 16:11:28 ON 15 SEP 2004)

     FILE 'MEDLINE, USPATFULL, DGENE, EMBASE, WPIDS, FSTA, CEN, CEABA-VTB,
     BIOSIS' ENTERED AT 16:12:03 ON 15 SEP 2004
L1          522 S ANTHOZOAN
L2         1784 S CNIDARIAN
L3           81 S L1 AND L2
L4           72 S L2 AND CHROMOPROTEIN
L5           24 S L4 AND (NON-BIOLUMINESCENT)
L6           24 S L5 AND L1
                E LUKYANOV,S/AU
                E YANUSHEVICH, Y/AU
L7            3 S E1
                E SAVITSKY, A/AU
                E FRADKOV, A/AU

=> s l2 and non-aggregating
L8           52 L2 AND NON-AGGREGATING

=> s l4 and l8
L9           51 L4 AND L8

=> s l9 and mutatn
L10           0 L9 AND MUTATN

=> s l9 and mutant
L11          51 L9 AND MUTANT

=> file medline
COST IN U.S. DOLLARS                          SINCE FILE      TOTAL
                                                 ENTRY    SESSION
FULL ESTIMATED COST                             140.47     140.68

FILE 'MEDLINE' ENTERED AT 16:22:52 ON 15 SEP 2004

 FILE LAST UPDATED: 14 SEP 2004 (20040914/UP).  FILE COVERS 1951 TO DATE.

 On February 29, 2004, the 2004 MeSH terms were loaded.  See HELP RLOAD
 for details. OLDMEDLINE now back to 1951.

 MEDLINE thesauri in the /CN, /CT, and /MN fields incorporate the
 MeSH 2004 vocabulary.  See http://www.nlm.nih.gov/mesh/ and
 http://www.nlm.nih.gov/pubs/techbull/nd03/nd03_mesh.html for a
 description of changes.

 This file contains CAS Registry Numbers for easy and accurate
 substance identification.

=> s l11
        148720 MUTANT
L12           0 L9 AND MUTANT

=> s cnidarian+NT/Ct
L13           0 CNIDARIAN+NT/CT  (1 TERM)

=> e cnidar?
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E7          151     CNIDARIANS/BI
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=> s e5
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=> s e6
L15         990 CNIDARIAN/BI

=> s e7
L16         151 CNIDARIANS/BI

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=> s e4
L17         407 ANTHOZOA/BI

=> s e7
L18          53 ANTHOZOAN/BI

=> s e8
L19          16 ANTHOZOANS/BI

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'ANTHOZOAN' NOT IN RELATIONSHIP FILE
RELATIONSHIP CODE 'NT' IGNORED
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=> d his

     (FILE 'HOME' ENTERED AT 16:11:28 ON 15 SEP 2004)

     FILE 'MEDLINE, USPATFULL, DGENE, EMBASE, WPIDS, FSTA, CEN, CEABA-VTB,
     BIOSIS' ENTERED AT 16:12:03 ON 15 SEP 2004
L1           522 S ANTHOZOAN
L2          1784 S CNIDARIAN
L3            81 S L1 AND L2
L4            72 S L2 AND CHROMOPROTEIN
L5            24 S L4 AND (NON-BIOLUMINESCENT)
L6            24 S L5 AND L1
                 E LUKYANOV,S/AU
                 E YANUSHEVICH, Y/AU
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L7             3 S E1
                 E SAVITSKY, A/AU
                 E FRADKOV, A/AU
L8            52 S L2 AND NON-AGGREGATING
L9            51 S L4 AND L8
L10            0 S L9 AND MUTATN
L11           51 S L9 AND MUTANT

     FILE 'MEDLINE' ENTERED AT 16:22:52 ON 15 SEP 2004
L12            0 S L11
L13            0 S CNIDARIAN+NT/CT
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L14         2392 S E5
L15          990 S E6
L16          151 S E7
                 E ANTHOZO?
L17          407 S E4
L18           53 S E7
L19           16 S E8
L20            0 S ANTHOZOAN+NT/CT

=> s l14 and l17
L21           72 L14 AND L17

=> s l21 and l4
L22            0 L21 AND L4

=> s l21 and l5
L23            0 L21 AND L5

=> s l21 and (non-bioluminescent)
       3280507 NON
          1083 BIOLUMINESCENT
             7 NON-BIOLUMINESCENT
                 (NON(W)BIOLUMINESCENT)
L24            0 L21 AND (NON-BIOLUMINESCENT)

=> s l21 and fluorescent mutant
        162572 FLUORESCENT
        148720 MUTANT
            13 FLUORESCENT MUTANT
                 (FLUORESCENT(W)MUTANT)
L25            0 L21 AND FLUORESCENT MUTANT

=> d his

     (FILE 'HOME' ENTERED AT 16:11:28 ON 15 SEP 2004)

     FILE 'MEDLINE, USPATFULL, DGENE, EMBASE, WPIDS, FSTA, CEN, CEABA-VTB,
     BIOSIS' ENTERED AT 16:12:03 ON 15 SEP 2004
L1           522 S ANTHOZOAN
L2          1784 S CNIDARIAN
L3            81 S L1 AND L2
L4            72 S L2 AND CHROMOPROTEIN
L5            24 S L4 AND (NON-BIOLUMINESCENT)
L6            24 S L5 AND L1
                 E LUKYANOV,S/AU
                 E YANUSHEVICH, Y/AU
L7             3 S E1
                 E SAVITSKY, A/AU
                 E FRADKOV, A/AU
L8            52 S L2 AND NON-AGGREGATING
L9            51 S L4 AND L8
L10            0 S L9 AND MUTATN
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L11          51 S L9 AND MUTANT

     FILE 'MEDLINE' ENTERED AT 16:22:52 ON 15 SEP 2004
L12           0 S L11
L13           0 S CNIDARIAN+NT/CT
                E CNIDAR?
L14        2392 S E5
L15         990 S E6
L16         151 S E7
                E ANTHOZO?
L17         407 S E4
L18          53 S E7
L19          16 S E8
L20           0 S ANTHOZOAN+NT/CT
L21          72 S L14 AND L17
L22           0 S L21 AND L4
L23           0 S L21 AND L5
L24           0 S L21 AND (NON-BIOLUMINESCENT)
L25           0 S L21 AND FLUORESCENT MUTANT

=> s l15 and l18
L26          14 L15 AND L18

=> d l26 ti abs ibib tot

L26  ANSWER 1 OF 14     MEDLINE on STN
TI   The cnidarian and the canon: the role of Wnt/beta-catenin
     signaling in the evolution of metazoan embryos.
AB   In a recent publication, Wikramanayake and colleagues have implicated the
     canonical Wnt/beta-catenin signaling pathway as a mediator of axial
     polarity and germ-layer specification in embryos of the cnidarian
     Nematostella.  In this anthozoan, beta-catenin is localized in
     nuclei of blastomeres in one region of the 16- to 32-cell embryo whose
     descendants subsequently form the entoderm of the embryo.  They claim that
     the pattern of nuclear localization is significant for two reasons: (1)
     when nuclear localization of beta-catenin was inhibited, gastrulation does
     not occur, and (2) when localization of beta-catenin took place in all
     cells of the pregastrula embryo, the number of entodermal cells increases.
     Since the Wnt/beta-catenin signaling pathway also plays a role in
     establishing axial polarity and specifying endoderm and mesoderm in a
     number of bilaterians, Wikramanayake et al. imply that this developmental
     mechanism is an evolutionary inheritance from a radially symmetrical
     ancestor.  Some of the gaps in the current evidence, which must be filled
     to evaluate their interpretation, are discussed.
     Copyright 2004 Wiley Periodicals, Inc.
ACCESSION NUMBER:    2004212195     MEDLINE
DOCUMENT NUMBER:     PubMed ID: 15112227
TITLE:               The cnidarian and the canon: the role of
                     Wnt/beta-catenin signaling in the evolution of metazoan
                     embryos.
AUTHOR:              Primus Alex; Freeman Gary
CORPORATE SOURCE:    Section of Integrative Biology, University of Texas,
                     Austin, TX 78712, USA.. primus_alexander@mail.utexas.edu
SOURCE:              BioEssays : news and reviews in molecular, cellular and
                     developmental biology, (2004 May) 26 (5) 474-8.
                     Journal code: 8510851. ISSN: 0265-9247.
PUB. COUNTRY:        United States
DOCUMENT TYPE:       Journal; Article; (JOURNAL ARTICLE)
LANGUAGE:            English
FILE SEGMENT:        Priority Journals
ENTRY MONTH:         200407
ENTRY DATE:          Entered STN: 20040428
                     Last Updated on STN: 20040723
                     Entered Medline: 20040722
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L26 ANSWER 2 OF 14 MEDLINE on STN

TI EST analysis of the **cnidarian** Acropora millepora reveals extensive gene loss and rapid sequence divergence in the model invertebrates.

AB A significant proportion of mammalian genes are not represented in the genomes of Drosophila, Caenorhabditis or Saccharomyces, and many of these are assumed to have been vertebrate innovations. To test this assumption, we conducted a preliminary EST project on the **anthozoan cnidarian**, Acropora millepora, a basal metazoan. More than 10% of the Acropora ESTs with strong metazoan matches to the databases had clear human homologs but were not represented in the Drosophila or Caenorhabditis genomes; this category includes a surprising diversity of transcription factors and metabolic proteins that were previously assumed to be restricted to vertebrates. Consistent with higher rates of divergence in the model invertebrates, three-way comparisons show that most Acropora ESTs match human sequences much more strongly than they do any Drosophila or Caenorhabditis sequence. Gene loss has thus been much more extensive in the model invertebrate lineages than previously assumed and, as a consequence, some genes formerly thought to be vertebrate inventions must have been present in the common metazoan ancestor. The complexity of the Acropora genome is paradoxical, given that this organism contains apparently few tissue types and the simplest extant nervous system consisting of a morphologically homogeneous nerve net.

ACCESSION NUMBER: 2003599137 MEDLINE
DOCUMENT NUMBER: PubMed ID: 14680636
TITLE: EST analysis of the **cnidarian** Acropora millepora reveals extensive gene loss and rapid sequence divergence in the model invertebrates.
COMMENT: Comment in: Curr Biol. 2004 Feb 3;14(3):R106-8. PubMed ID: 14986636
AUTHOR: Kortschak R Daniel; Samuel Gabrielle; Saint Robert; Miller David J
CORPORATE SOURCE: Centre for the Molecular Genetics of Development and Molecular Genetics and Evolution Group, Research School of Biological Sciences, Australian National University, P.O. Box 475, Canberra, ACT 2601, Australia.
SOURCE: Current biology : CB, (2003 Dec 16) 13 (24) 2190-5. Journal code: 9107782. ISSN: 0960-9822.
PUB. COUNTRY: England: United Kingdom
DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals
ENTRY MONTH: 200403
ENTRY DATE: Entered STN: 20031219
Last Updated on STN: 20040320
Entered Medline: 20040319

L26 ANSWER 3 OF 14 MEDLINE on STN

TI Hox and paraHox genes from the **anthozoan** Parazoanthus parasiticus.

AB We surveyed the genome of the Caribbean zoanthid Parazoanthus parasiticus for Hox and paraHox genes, and examined gene expression patterns for sequences we uncovered. Two Hox genes and three paraHox genes were identified in our surveys. The Hox genes belong to anterior and posterior classes. In phylogenetic analyses, the anterior Hox sequence formed an **anthozoan**-specific cluster that appears to be a second class of **cnidarian** anterior Hox gene. The presence of an anterior Gsx-like paraHox gene supports the hypothesis that duplication of a protoHox gene family preceded the divergence of the Cnidaria and bilaterians. The presence of two Mox class paraHox genes in P. parasiticus deserves further attention. Expression analysis using RT-PCR, indicated that one Mox gene and the anterior paraHox gene are not expressed in adult tissue, whereas the other three sequences are expressed in both dividing and unitary

polyps. Dividing polyps showed slightly lower Ppox1 (i.e., Mox) expression levels. Our data add to the number of published **anthozoan** sequences, and provide additional detail concerning the evolutionary significance of **cnidarian** Hox and paraHox genes.

ACCESSION NUMBER: 2003391565 MEDLINE
DOCUMENT NUMBER: PubMed ID: 12927136
TITLE: Hox and paraHox genes from the **anthozoan** Parazoanthus parasiticus.
AUTHOR: Hill April; Wagner Aimee; Hill Malcolm
CORPORATE SOURCE: Biology Department, Fairfield University, Fairfield, CT 06430, USA.. ahill@fair1.fairfield.edu
SOURCE: Molecular phylogenetics and evolution, (2003 Sep) 28 (3) 529-35.
Journal code: 9304400. ISSN: 1055-7903.
PUB. COUNTRY: United States
DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals
ENTRY MONTH: 200404
ENTRY DATE: Entered STN: 20030821
Last Updated on STN: 20040407
Entered Medline: 20040406

L26 ANSWER 4 OF 14 MEDLINE on STN
TI The ancestral role of Brachyury: expression of NemBra1 in the basal **cnidarian** Nematostella vectensis (Anthozoa).
AB The T-Box transcription factor Brachyury plays important roles in the development of all bilateral animals examined so far. In order to understand the ancestral function of Brachyury we cloned NemBra1, a Brachyury homolog from the **anthozoan** sea anemone Nematostella vectensis. Anthozoa are considered the basal group among the Cnidaria. First NemBra1 expression could be detected at the blastula/gastrula transition and gene activity persists until adulthood of the animals. In situ hybridization shows that NemBra1 expression in gastrulae and early planula larvae is restricted to a circle around the blastopore. When the larvae begin to metamorphose into primary polyps, the expression zone extends into the developing mesenteries. In adult polyps Brachyury expression persists in the mesenteries, but is excluded from the septal filament and the differentiated retractor muscles, which also develop from the mesenteries. We conclude that the ancestral function of Brachyury was in specifying the blastopore and its endodermal derivatives.

ACCESSION NUMBER: 2003028223 MEDLINE
DOCUMENT NUMBER: PubMed ID: 12536320
TITLE: The ancestral role of Brachyury: expression of NemBra1 in the basal **cnidarian** Nematostella vectensis (Anthozoa).
AUTHOR: Scholz Corinna B; Technau Ulrich
CORPORATE SOURCE: Molecular Cell Biology, Institute of Zoology, Darmstadt University of Technology, Schnittspahnstrasse 10, 64287 Darmstadt, Germany.. Technau@bio.tu-darmstadt.de
SOURCE: Development genes and evolution, (2003 Jan) 212 (12) 563-70.
Journal code: 9613264. ISSN: 0949-944X.
PUB. COUNTRY: Germany: Germany, Federal Republic of
DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals
ENTRY MONTH: 200308
ENTRY DATE: Entered STN: 20030122
Last Updated on STN: 20030823
Entered Medline: 20030822

L26 ANSWER 5 OF 14 MEDLINE on STN
TI Precambrian animal life: probable developmental and adult

cnidarian forms from Southwest China.

AB The evolutionary divergence of **cnidarian** and bilaterian lineages from their remote metazoan ancestor occurred at an unknown depth in time before the Cambrian, since crown group representatives of each are found in Lower Cambrian fossil assemblages. We report here a variety of putative embryonic, larval, and adult microfossils deriving from Precambrian phosphorite deposits of Southwest China, which may predate the Cambrian radiation by 25-45 million years. These are most probably of **cnidarian** affinity. Large numbers of fossilized early planula-like larvae were observed under the microscope in sections. Though several forms are represented, the majority display remarkable conformity, which is inconsistent with the alternative that they are artifactual mineral inclusions. Some of these fossils are preserved in such high resolution that individual cells can be discerned. We confirm in detail an earlier report of the presence in the same deposits of tabulates, an extinct crown group **anthozoan** form. Other sections reveal structures that most closely resemble sections of basal modern corals. A large number of fossils similar to modern hydrozoan gastrulae were also observed. These again displayed great morphological consistency. Though only a single example is available, a microscopic animal remarkably similar to a modern adult hydrozoan is also presented. Taken together, the new observations reported in this paper indicate the existence of a diverse and already differentiated **cnidarian** fauna, long before the Cambrian evolutionary event. It follows that at least stem group bilaterians must also have been present at this time.

ACCESSION NUMBER: 2002393732 MEDLINE
DOCUMENT NUMBER: PubMed ID: 12142030
TITLE: Precambrian animal life: probable developmental and adult **cnidarian** forms from Southwest China.
AUTHOR: Chen Jun-Yuan; Oliveri Paola; Gao Feng; Dornbos Stephen Q; Li Chia-Wei; Bottjer David J; Davidson Eric H
CORPORATE SOURCE: Nanjing Institute of Geology and Paleontology, Nanjing 210008, China.
SOURCE: Developmental biology, (2002 Aug 1) 248 (1) 182-96. Journal code: 0372762. ISSN: 0012-1606. (Investigators: Davidson E H, CA Inst Technol, Pasadena)
PUB. COUNTRY: United States
DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals; Space Life Sciences
ENTRY MONTH: 200208
ENTRY DATE: Entered STN: 20020727
Last Updated on STN: 20020917
Entered Medline: 20020829

L26 ANSWER 6 OF 14 MEDLINE on STN

TI The evolution of nuclear receptors: evidence from the coral Acropora.

AB We have amplified and sequenced PCR products derived from 10 nuclear receptor (NR) genes from the **anthozoan cnidarian** Acropora millepora, including five products corresponding to genes not previously reported from the phylum Cnidaria. cDNAs corresponding to seven of these products were sequenced and at least three encode full-length proteins, increasing the number of complete **cnidarian** NR coding sequences from one to four. All clear orthologs of Acropora NRs either lack an activation domain or lack a known ligand, consistent with the idea that the ancestral nuclear receptor was without a ligand. Phylogenetic analyses indicate that most, and possibly all, presently identified **cnidarian** NRs are members of NR subfamily 2, suggesting that the common ancestor of all known nuclear receptors most resembled members of this subfamily.

ACCESSION NUMBER: 2001558273 MEDLINE
DOCUMENT NUMBER: PubMed ID: 11603940
TITLE: The evolution of nuclear receptors: evidence from the coral

Acropora.
AUTHOR: Grasso L C; Hayward D C; Trueman J W; Hardie K M; Janssens P A; Ball E E
CORPORATE SOURCE: Research School of Biological Sciences, Australian National University, Canberra, ACT 2601, Australia.
SOURCE: Molecular phylogenetics and evolution, (2001 Oct) 21 (1) 93-102.
Journal code: 9304400. ISSN: 1055-7903.
PUB. COUNTRY: United States
DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals
ENTRY MONTH: 200112
ENTRY DATE: Entered STN: 20011018
Last Updated on STN: 20020122
Entered Medline: 20011205

L26 ANSWER 7 OF 14 MEDLINE on STN
TI Gene structure and larval expression of cnox-2Am from the coral Acropora millepora.
AB We have cloned a Hox-like gene, cnox-2Am, from a staghorn coral, Acropora millepora, an **anthozoan cnidarian**, and characterised its embryonic and larval expression. cnox-2Am and its orthologs in other cnidarians and Trichoplax most closely resemble the Gsx and, to a lesser extent, Hox 3/4 proteins. Developmental northern blots and in situ hybridisation are consistent in showing that cnox-2Am message appears in the planula larva shortly after the oral/aboral axis is formed following gastrulation. Expression is localised in scattered ectodermal cells with a restricted distribution along the oral/aboral body axis. They are most abundant along the sides of the cylindrical larva, rare in the oral region and absent from the aboral region. These cells, which on morphological grounds we believe to be neurons, are of two types; one tri-or multipolar near the basement membrane and a second extending projections in both directions from a mid-ectodermal nucleus. Anti-RFamide staining reveals neurons with a similar morphology to the cnox-2Am-expressing cells. However, RFamide-expressing neurons are more abundant, especially at the aboral end of the planula, where there is no cnox-2Am expression. The pattern of expression of cnox-2Am resembles that of Gsx orthologs in Drosophila and vertebrates in being expressed in a spatially restricted portion of the nervous system.
ACCESSION NUMBER: 2001183688 MEDLINE
DOCUMENT NUMBER: PubMed ID: 11277400
TITLE: Gene structure and larval expression of cnox-2Am from the coral Acropora millepora.
AUTHOR: Hayward D C; Catmull J; Reece-Hoyes J S; Berghammer H; Dodd H; Hann S J; Miller D J; Ball E E
CORPORATE SOURCE: Research School of Biological Sciences, Australian National University, Canberra.
SOURCE: Development genes and evolution, (2001 Jan) 211 (1) 10-9.
Journal code: 9613264. ISSN: 0949-944X.
PUB. COUNTRY: Germany: Germany, Federal Republic of
DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals
OTHER SOURCE: GENBANK-AF245689
ENTRY MONTH: 200108
ENTRY DATE: Entered STN: 20010827
Last Updated on STN: 20010827
Entered Medline: 20010823

L26 ANSWER 8 OF 14 MEDLINE on STN
TI Pax gene diversity in the basal **cnidarian** Acropora millepora (Cnidaria, Anthozoa): implications for the evolution of the Pax gene family.

AB Pax genes encode a family of transcription factors, many of which play key roles in animal embryonic development but whose evolutionary relationships and ancestral functions are unclear. To address these issues, we are characterizing the Pax gene complement of the coral Acropora millepora, an **anthozoan cnidarian**. As the simplest animals at the tissue level of organization, cnidarians occupy a key position in animal evolution, and the Anthozoa are the basal class within this diverse phylum. We have identified four Pax genes in Acropora: two (Pax-Aam and Pax-Bam) are orthologs of genes identified in other cnidarians; the others (Pax-Cam and Pax-Dam) are unique to Acropora. Pax-Aam may be orthologous with Drosophila Pox neuro, and Pax-Bam clearly belongs to the Pax-2/5/8 class. The Pax-Bam Paired domain binds specifically and preferentially to Pax-2/5/8 binding sites. The recently identified Acropora gene Pax-Dam belongs to the Pax-3/7 class. Clearly, substantial diversification of the Pax family occurred before the Cnidaria/higher Metazoa split. The fourth Acropora Pax gene, Pax-Cam, may correspond to the ancestral vertebrate Pax gene and most closely resembles Pax-6. The expression pattern of Pax-Cam, in putative neurons, is consistent with an ancestral role of the Pax family in neural differentiation and patterning. We have determined the genomic structure of each Acropora Pax gene and show that some splice sites are shared both between the coral genes and between these and Pax genes in triploblastic metazoans. Together, these data support the monophyly of the Pax family and indicate ancient origins of several introns.

ACCESSION NUMBER: 2000243720 MEDLINE
DOCUMENT NUMBER: PubMed ID: 10781047
TITLE: Pax gene diversity in the basal **cnidarian** Acropora millepora (Cnidaria, Anthozoa): implications for the evolution of the Pax gene family.
AUTHOR: Miller D J; Hayward D C; Reece-Hoyes J S; Scholten I; Catmull J; Gehring W J; Callaerts P; Larsen J E; Ball E E
CORPORATE SOURCE: Department of Biochemistry and Molecular Biology, James Cook University, Townsville, Queensland 4811, Australia.. david.miller@jcu.edu.au
SOURCE: Proceedings of the National Academy of Sciences of the United States of America, (2000 Apr 25) 97 (9) 4475-80. Journal code: 7505876. ISSN: 0027-8424.
PUB. COUNTRY: United States
DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals
OTHER SOURCE: GENBANK-AF053458; GENBANK-AF053459; GENBANK-AF241310; GENBANK-AF241311
ENTRY MONTH: 200005
ENTRY DATE: Entered STN: 20000606
Last Updated on STN: 20000606
Entered Medline: 20000524

L26 ANSWER 9 OF 14 MEDLINE on STN
TI Precambrian animal diversity: putative phosphatized embryos from the Doushantuo Formation of China.
AB Putative fossil embryos and larvae from the Precambrian phosphorite rocks of the Doushantuo Formation in Southwest China have been examined in thin section by bright field and polarized light microscopy. Although we cannot completely exclude a nonbiological or nonmetazoan origin, we identified what appear to be modern **cnidarian** developmental stages, including both **anthozoan** planula larvae and hydrozoan embryos. Most importantly, the sections contain a variety of small (</=200 microm) structures that greatly resemble gastrula stage embryos of modern bilaterian forms.

ACCESSION NUMBER: 2000243717 MEDLINE
DOCUMENT NUMBER: PubMed ID: 10781044
TITLE: Precambrian animal diversity: putative phosphatized embryos from the Doushantuo Formation of China.

AUTHOR: Chen J Y; Oliveri P; Li C W; Zhou G Q; Gao F; Hagadorn J W; Peterson K J; Davidson E H
CORPORATE SOURCE: Nanjing Institute of Geology and Paleontology, Nanjing 210008, China.. chenjy@jlonline.com
SOURCE: Proceedings of the National Academy of Sciences of the United States of America, (2000 Apr 25) 97 (9) 4457-62. Journal code: 7505876. ISSN: 0027-8424. (Investigators: Davidson E, CA Inst Tech, Pasadena)
PUB. COUNTRY: United States
DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals; Space Life Sciences
ENTRY MONTH: 200005
ENTRY DATE: Entered STN: 20000606
Last Updated on STN: 20020321
Entered Medline: 20000524

L26 ANSWER 10 OF 14 MEDLINE on STN
TI Scyphozoan jellyfish's mesoglea supports attachment, spreading and migration of anthozoans' cells in vitro.
AB Mechanically and enzymatically dissociated cells from five **anthozoan** species were laid on seven substrates in vitro. Cells were taken from two sea anemones (Aiptasia sp. and Anemonia sulcata), a scleractinian coral (Stylophora pistillata) and two alcyonacean corals (Heteroxenia fuscescence and Nephthea sp). Substrates tested: glass (coverslips), plastic (uncoated tissue culture plates), type IV collagen, gelatin, fibronectin, mesoglea pieces from the scyphozoan jellyfish Rhopilema nomadica and acetic acid extract of jellyfish mesoglea. Except for the mesoglea pieces, cells did not respond to any one of the other substrates, retaining their rounded shape. Following contact with mesoglea pieces, cells attached and spread. Subsequently they migrated into the mesogleal matrix at a rate of 5-10 microm/h during the first 2-5 h. No difference was found between the behavior of cells from the five different **cnidarian** species.

ACCESSION NUMBER: 2000069155 MEDLINE
DOCUMENT NUMBER: PubMed ID: 10600239
TITLE: Scyphozoan jellyfish's mesoglea supports attachment, spreading and migration of anthozoans' cells in vitro.
AUTHOR: Frank U; Rinkevich B
CORPORATE SOURCE: The National Institute of Oceanography, Israel Oceanographic and Limnological Research, Haifa, 31080, Israel.. frank@www.zoo.uni-heidelberg.de
SOURCE: Cell biology international, (1999) 23 (4) 307-11. Journal code: 9307129. ISSN: 1065-6995.
PUB. COUNTRY: ENGLAND: United Kingdom
DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals
ENTRY MONTH: 200002
ENTRY DATE: Entered STN: 20000209
Last Updated on STN: 20000209
Entered Medline: 20000201

L26 ANSWER 11 OF 14 MEDLINE on STN
TI Melatonin in a primitive metazoan: seasonal changes of levels and immunohistochemical visualization in neurons.
AB Monthly day/night melatonin activity profiles were determined by radioimmunoassay over a 13-month period in the colonial **anthozoan** Renilla kollikeri, and no daily rhythmic oscillation was found. Averaging those monthly values yielded a seasonal quantitative rhythm in both colonial and non-colonial tissues of this **cnidarian**, with spring and summer levels found to be four to five times higher than autumn and winter ones. The annual rise, which occurred in two successive Aprils,

coincided with the first stages of sexual maturation in R. kollikeri. Immunohistochemistry with a melatonin antibody raised in sheep revealed an exclusively neuronal distribution of melatonin-immunoreactivity (MEL-IR) in the endodermal septal filaments wrapped around gametophores, in endodermal walls of the rachis, and in the ectoderm of polyps. The MEL-IR ectodermal neurons shared many morphological features with serotonin-immunoreactive (5-HT-IR) neurons previously described in this animal but showed either weak or absent 5-HT-IR in double-labelling experiments. In contrast, MEL-IR and 5-HT-IR were strongly colocalized in endodermal neurons. These results indicate that melatonin is not a daily photoperiodic messenger but may instead act as a seasonal marker for reproduction in this **cnidarian**. We also provide the first evidence of a neuronal localisation of melatonin in an invertebrate, which suggests that melatonin may act as a neurotransmitter or neurohormone in the least evolved animals endowed with a nervous system.

ACCESSION NUMBER: 97475975 MEDLINE
DOCUMENT NUMBER: PubMed ID: 9336226
TITLE: Melatonin in a primitive metazoan: seasonal changes of levels and immunohistochemical visualization in neurons.
AUTHOR: Mechawar N; Anctil M
CORPORATE SOURCE: Departement de Sciences Biologiques and Centre de Recherche en Sciences Neurologiques, Universite de Montreal, Quebec, Canada.
SOURCE: Journal of comparative neurology, (1997 Oct 20) 387 (2) 243-54.
Journal code: 0406041. ISSN: 0021-9967.
PUB. COUNTRY: United States
DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals
ENTRY MONTH: 199711
ENTRY DATE: Entered STN: 19971224
Last Updated on STN: 19971224
Entered Medline: 19971120

L26 ANSWER 12 OF 14 MEDLINE on STN
TI Class-level relationships in the phylum Cnidaria: evidence from mitochondrial genome structure.
AB The phylogenetic relationships of the Recent **cnidarian** classes remain one of the classic problems in invertebrate zoology. We survey the structure of the mitochondrial genome in representatives of the four extant **cnidarian** classes and in the phylum Ctenophora. We find that all **anthozoan** species tested possess mtDNA in the form of circular molecules, whereas all scyphozoan, cubozoan, and hydrozoan species tested display mtDNA in the form of linear molecules. Because ctenophore and all other known metazoan mtDNA is circular, the shared occurrence of linear mtDNA in three of the four **cnidarian** classes suggests a basal position for the Anthozoa within the phylum.

ACCESSION NUMBER: 92409594 MEDLINE
DOCUMENT NUMBER: PubMed ID: 1356268
TITLE: Class-level relationships in the phylum Cnidaria: evidence from mitochondrial genome structure.
AUTHOR: Bridge D; Cunningham C W; Schierwater B; DeSalle R; Buss L W
CORPORATE SOURCE: Department of Biology, Yale University, New Haven, CT 06511.
SOURCE: Proceedings of the National Academy of Sciences of the United States of America, (1992 Sep 15) 89 (18) 8750-3.
Journal code: 7505876. ISSN: 0027-8424.
PUB. COUNTRY: United States
DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals
ENTRY MONTH: 199210

ENTRY DATE: Entered STN: 19921106
Last Updated on STN: 19950206
Entered Medline: 19921022

L26 ANSWER 13 OF 14 MEDLINE on STN
TI Serotonin-immunoreactive neurons in the **cnidarian** Renilla koellikeri.
AB The cellular localization of 5-hydroxytryptamine (5-HT) was investigated in the pennatulid **anthozoan** Renilla koellikeri by means of peroxidase-antiperoxidase-immunohistochemistry with an antiserum against 5-HT-formaldehyde-protein conjugate. In many colonies, strong 5-HT-immunoreactivity was displayed by the cell bodies and beaded processes of relatively small neuronlike elements predominating in the outer ectoderm or scattered in the underlying mesoglea. The immunostained neurons of the mesoglea were generally bipolar and their relatively short processes extended toward myoepithelial cells. In the ectoderm, most immunostained neurons appeared pseudounipolar. These cell bodies were endowed with a small, superficially directed, conical appendage reaching the outer surface of the epithelium. Their neurites emerged from the inner pole of the perikarya and branched toward other immunopositive ectodermal and mesogleal nerve cells, or nematocytes in the tentacles. The networklike distribution of the presumed 5-HT ectodermal neurons varied between the different regions of colonies and along the autozooid column. In the context of earlier observations in cnidarians, these cytological features suggest a sensory as well as a modulatory function for 5-HT in Renilla koellikeri.
ACCESSION NUMBER: 90131227 MEDLINE
DOCUMENT NUMBER: PubMed ID: 1967616
TITLE: Serotonin-immunoreactive neurons in the **cnidarian** Renilla koellikeri.
AUTHOR: Umbriaco D; Anctil M; Descarries L
CORPORATE SOURCE: Departement de sciences biologiques, Universite de Montreal, Quebec, Canada.
SOURCE: Journal of comparative neurology, (1990 Jan 8) 291 (2) 167-78.
Journal code: 0406041. ISSN: 0021-9967.
PUB. COUNTRY: United States
DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals
ENTRY MONTH: 199003
ENTRY DATE: Entered STN: 19900328
Last Updated on STN: 19950206
Entered Medline: 19900308

L26 ANSWER 14 OF 14 MEDLINE on STN
TI Find structural aspects of **anthozoan** desmocyte development (phylum Cnidaria).
AB The fine structural changes associated with the differentiation of skeletogenic cells into cells specialized in binding soft tissues onto skeletal structures are described in the gorgonian coral, Leptogorgia virgulata (Lam.). These binding cells are called desmocytes. The sequence of events in desmocyte development includes: growth of the plasma membrane, invagination of the mesoglea-end of the cell, expansion of the axis-end of the cell, loss of organelles involved in skeletogenesis, proliferation of double vesicles and transformation of double vesicles into cytoskeletal rods. Double vesicles appear either cup-shaped or as a vesicle within a vesicle in sectioned material. These observations of desmocyte development are compared to previous light microscopical observations desmocyte development in diverse forms of anthozoans. Similarities in desmocyte development throughout the class include invagination of the differentiating cell, formation of a pectinate mesogleal margin and formation of an array of cytoskeletal rods at the axis-end of the cell. Comparison with available information on the

development and fine structure of desmocytes in the **cnidarian** classes Scyphozoa and Hydrozoa shows these similarities do not extend across class boundaries and, therefore, common ancestry between the three classes of **cnidarian** desmocytes seems remote if, indeed, such an ancestral cell existed at all.

ACCESSION NUMBER: 82224725 MEDLINE
DOCUMENT NUMBER: PubMed ID: 6124054
TITLE: Find structural aspects of **anthozoan** desmocyte development (phylum Cnidaria).
AUTHOR: Tidball J G
SOURCE: Tissue & cell, (1982) 14 (1) 85-96.
Journal code: 0214745. ISSN: 0040-8166.
PUB. COUNTRY: ENGLAND: United Kingdom
DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals
ENTRY MONTH: 198208
ENTRY DATE: Entered STN: 19900317
Last Updated on STN: 19950206
Entered Medline: 19820826

=> d his

(FILE 'HOME' ENTERED AT 16:11:28 ON 15 SEP 2004)

FILE 'MEDLINE, USPATFULL, DGENE, EMBASE, WPIDS, FSTA, CEN, CEABA-VTB, BIOSIS' ENTERED AT 16:12:03 ON 15 SEP 2004

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L1          522 S ANTHOZOAN
L2         1784 S CNIDARIAN
L3           81 S L1 AND L2
L4           72 S L2 AND CHROMOPROTEIN
L5           24 S L4 AND (NON-BIOLUMINESCENT)
L6           24 S L5 AND L1
                E LUKYANOV,S/AU
                E YANUSHEVICH, Y/AU
L7            3 S E1
                E SAVITSKY, A/AU
                E FRADKOV, A/AU
L8           52 S L2 AND NON-AGGREGATING
L9           51 S L4 AND L8
L10           0 S L9 AND MUTATN
L11          51 S L9 AND MUTANT
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FILE 'MEDLINE' ENTERED AT 16:22:52 ON 15 SEP 2004

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L12           0 S L11
L13           0 S CNIDARIAN+NT/CT
                E CNIDAR?
L14        2392 S E5
L15         990 S E6
L16         151 S E7
                E ANTHOZO?
L17         407 S E4
L18          53 S E7
L19          16 S E8
L20           0 S ANTHOZOAN+NT/CT
L21          72 S L14 AND L17
L22           0 S L21 AND L4
L23           0 S L21 AND L5
L24           0 S L21 AND (NON-BIOLUMINESCENT)
L25           0 S L21 AND FLUORESCENT MUTANT
L26          14 S L15 AND L18
```

=> s l17 and nucleic acid

```
        170490 NUCLEIC
       1281458 ACID
        157272 NUCLEIC ACID
                  (NUCLEIC(W)ACID)
L27          10 L17 AND NUCLEIC ACID

=> d l27 ti abs ibib tot

L27  ANSWER 1 OF 10     MEDLINE on STN
TI   Coronaviruses as vectors: position dependence of foreign gene expression.
AB   Coronaviruses are the enveloped, positive-stranded RNA viruses with the
     largest RNA genomes known. Several features make these viruses attractive
     as vaccine and therapeutic vectors: (i) deletion of their nonessential
     genes is strongly attenuating; (ii) the genetic space thus created allows
     insertion of foreign information; and (iii) their tropism can be modified
     by manipulation of the viral spike. We studied here their ability to
     serve as expression vectors by inserting two different foreign genes and
     evaluating systematically the genomic position dependence of their
     expression, using a murine coronavirus as a model. Renilla and firefly
     luciferase expression cassettes, each provided with viral transcription
     regulatory sequences (TRSs), were inserted at several genomic positions,
     both independently in different viruses and combined within one viral
     genome. Recombinant viruses were generated by using a convenient method
     based on targeted recombination and host cell switching. In all cases
     high expression levels of the foreign genes were observed without severe
     effects on viral replication in vitro. The expression of the inserted
     gene appeared to be dependent on its genomic position, as well as on the
     identity of the gene. Expression levels increased when the luciferase
     gene was inserted closer to the 3' end of the genome. The foreign gene
     insertions generally reduced the expression of upstream viral genes. The
     results are consistent with coronavirus transcription models in which the
     transcription from upstream TRSs is attenuated by downstream TRSs.
     Altogether, our observations clearly demonstrate the potential of
     coronaviruses as (multivalent) expression vectors.
ACCESSION NUMBER:    2003479410     MEDLINE
DOCUMENT NUMBER:     PubMed ID: 14557617
TITLE:               Coronaviruses as vectors: position dependence of foreign
                     gene expression.
AUTHOR:              de Haan Cornelis A M; van Genne Linda; Stoop Jeroen N;
                     Volders Haukeline; Rottier Peter J M
CORPORATE SOURCE:    Virology Division, Department of Infectious Diseases and
                     Immunology, Faculty of Veterinary Medicine and Institute of
                     Biomembranes, Utrecht University, 3584 CL Utrecht, The
                     Netherlands.
SOURCE:              Journal of virology, (2003 Nov) 77 (21) 11312-23.
                     Journal code: 0113724. ISSN: 0022-538X.
PUB. COUNTRY:        United States
DOCUMENT TYPE:       (EVALUATION STUDIES)
                     Journal; Article; (JOURNAL ARTICLE)
LANGUAGE:            English
FILE SEGMENT:        Priority Journals
ENTRY MONTH:         200312
ENTRY DATE:          Entered STN: 20031015
                     Last Updated on STN: 20031219
                     Entered Medline: 20031202

L27  ANSWER 2 OF 10     MEDLINE on STN
TI   Phylogenetic analyses among octocorals (Cnidaria): mitochondrial and
     nuclear DNA sequences (lsu-rRNA, 16S and ssu-rRNA, 18S) support two
     convergent clades of branching gorgonians.
AB   Gorgonian octocorals lack corroborated hypotheses of phylogeny. This
     study reconstructs genealogical relationships among some octocoral species
     based on published DNA sequences from the large ribosomal subunit of the
     mitochondrial RNA (lsu-rRNA, 16S: 524bp and 21 species) and the small
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subunit of the nuclear RNA (ssu-rRNA, 18S: 1815bp and 13 spp) using information from insertions-deletions (INDELS) and the predicted secondary structure of the lsu-rRNA (16S). There were seven short (3-10bp) INDELS in the 18S with consistent phylogenetic information. The INDELS in the 16S corresponded to informative signature sequences homologous to the G13 helix found in Escherichia coli. We found two main groups of gorgonian octocorals using a maximum parsimony analysis of the two genes. One group corresponds to deep-water taxa including species from the suborders Calcaxonia and Scleraxonia characterized by an enlargement of the G13 helix. The second group has species from Alcyoniina, Holaxonia and again Scleraxonia characterized by insertions in the 18S. Gorgonian corals, branching colonies with a gorgonin-containing flexible multilayered axis (Holaxonia and Calcaxonia), do not form a monophyletic group. These corroborated results from maternally inherited (16S) and biparentally inherited (18S) genes support a hypothesis of independent evolution of branching in the two octocoral clades.

ACCESSION NUMBER: 2003427480 MEDLINE
DOCUMENT NUMBER: PubMed ID: 12967605
TITLE: Phylogenetic analyses among octocorals (Cnidaria): mitochondrial and nuclear DNA sequences (lsu-rRNA, 16S and ssu-rRNA, 18S) support two convergent clades of branching gorgonians.
AUTHOR: Armando Sanchez Juan; Lasker Howard R; Taylor Derek J
CORPORATE SOURCE: Department of Biological Sciences, 109 Cooke Hall, University at Buffalo (The State University of New York), Buffalo, NY 14260, USA.. jsanchez@lab.si.edu
SOURCE: Molecular phylogenetics and evolution, (2003 Oct) 29 (1) 31-42.
Journal code: 9304400. ISSN: 1055-7903.
PUB. COUNTRY: United States
DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals
ENTRY MONTH: 200311
ENTRY DATE: Entered STN: 20030912
Last Updated on STN: 20031218
Entered Medline: 20031128

L27 ANSWER 3 OF 10 MEDLINE on STN
TI Molecular genetic identification of crustose representatives of the order Corallinales (Rhodophyta) in Chile.
AB Knowledge on species of the order Corallinales along the coast of Chile is still scarce despite a number of studies and records of other divisions of seaweeds made since the early 20th century. This lack of information is more dramatic among crustose representatives of the order, thus depriving biogeographic studies of a thorough analysis and resulting in inadequately representative accounts of biodiversity. The currently changing taxonomy of the group makes it difficult to identify and differentiate among taxa based on morphological and developmental characters. Therefore, the use of molecular tools has been adopted in this study in order to facilitate identification and comparison of crustose corallines collected at the rocky intertidal between 27 degrees and 48 degrees S along the Pacific temperate coast of South America. A sequence 600bp (in length) from the SSU-rDNA gene was used to identify five taxa to the genus level: Lithophyllum, Spongites, Mesophyllum, Synarthrophyton, and Leptophytum. In all cases, the genus distinction based on morphological characters coincide with designations based on variation in the ribosomal DNA gene sequence. Spongites is the most frequently occurring genus and is found in all localities sampled while the others appear occasionally. Taxa recognition at species level must be examined with caution considering that morphological variability is not well understood in Chile because the SSU-rDNA region sequence does not always stand alone as an unambiguous means of identifying all coralline species. In such cases, more rapidly evolving markers are needed. For example, sequences from the ITS (rDNA)

region often provide greater resolution among closely related species and genera. However, the methodology presented here remains a useful tool for species-level identification.

ACCESSION NUMBER: 2003391556 MEDLINE
DOCUMENT NUMBER: PubMed ID: 12927127
TITLE: Molecular genetic identification of crustose representatives of the order Corallinales (Rhodophyta) in Chile.
AUTHOR: Vidal Rodrigo; Meneses Isabel; Smith Macarena
CORPORATE SOURCE: Departamento de Biologia, Facultad de Quimica y Biologia, Universidad de Santiago, Chile.
SOURCE: Molecular phylogenetics and evolution, (2003 Sep) 28 (3) 404-19.
Journal code: 9304400. ISSN: 1055-7903.
PUB. COUNTRY: United States
DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals
ENTRY MONTH: 200404
ENTRY DATE: Entered STN: 20030821
Last Updated on STN: 20040407
Entered Medline: 20040406

L27 ANSWER 4 OF 10 MEDLINE on STN
TI Preliminary evidence for human fecal contamination in corals of the Florida Keys, USA.
AB Corals and reef environments are under increased stress from anthropogenic activities, particularly those in the vicinity of heavily populated areas such as the Florida Keys. The potential adverse impacts of wastewater can affect both the environment and humán health; however, because of the high decay rate of bacterial indicators in coral reef waters it has been difficult to document the presence of microbial contaminants and to assign risks in these environments. Here we show initial evidence that microorganisms associated with human feces are concentrated along the surface of coral heads relative to the overlying water column in the Florida Keys. Bacterial indicators (fecal coliform bacteria, enterococci or Clostridium perfringens) were detected in 66.7% of the coral surface microlayer (CSM) samples at levels between five and 1000 CFU/100 ml, but were found infrequently and at low numbers in the overlying water column (< or = 2.5 CFU/100 ml). Similarly, enterovirus **nucleic acid** sequences, an indicator of human-specific waste, were detected in 93.3% of the CSM samples and only once in the water column by cell culture. Results show that coral mucus may accumulate enteric microorganisms in reef environments, and may indicate a risk to public and environmental health despite low indicator levels in the surrounding water.

ACCESSION NUMBER: 2002463611 MEDLINE
DOCUMENT NUMBER: PubMed ID: 12222890
TITLE: Preliminary evidence for human fecal contamination in corals of the Florida Keys, USA.
AUTHOR: Lipp Erin K; Jarrell Jennifer L; Griffin Dale W; Lukasik Jerzy; Jacukiewicz Jennifer; Rose Joan B
CORPORATE SOURCE: College of Marine Science, University of South Florida, St. Petersburg 33701, USA.. lipp@umbi.umd.edu
SOURCE: Marine pollution bulletin, (2002 Jul) 44 (7) 666-70.
Journal code: 0260231. ISSN: 0025-326X.
PUB. COUNTRY: England: United Kingdom
DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals
ENTRY MONTH: 200301
ENTRY DATE: Entered STN: 20020912
Last Updated on STN: 20030130
Entered Medline: 20030129

L27 ANSWER 5 OF 10 MEDLINE on STN

TI The mitochondrial genome of Acropora tenuis (Cnidaria; Scleractinia) contains a large group I intron and a candidate control region.

AB The complete nucleotide sequence of the mitochondrial genome of the coral Acropora tenuis has been determined. The 18,338 bp A. tenuis mitochondrial genome contains the standard metazoan complement of 13 protein-coding and two rRNA genes, but only the same two tRNA genes (trnM and trnW) as are present in the mtDNA of the sea anemone, Metridium senile. The A. tenuis nad5 gene is interrupted by a large group I intron which contains ten protein-coding genes and rns; M. senile has an intron at the same position but this contains only two protein-coding genes. Despite the large distance (about 11.5 kb) between the 5?-exon and 3?-exon boundaries, the A. tenuis nad5 gene is functional, as we were able to RT-PCR across the predicted intron splice site using total RNA from A. tenuis. As in M. senile, all of the genes in the A. tenuis mt genome have the same orientation, but their organization is completely different in these two zoantharians: The only common gene boundaries are those at each end of the group I intron and between trnM and rnl. Finally, we provide evidence that the rns-cox3 intergenic region in A. tenuis may correspond to the mitochondrial control region of higher animals. This region contains repetitive elements, and has the potential to form secondary structures of the type characteristic of vertebrate D-loops. Comparisons between a wide range of Acropora species showed that a long hairpin predicted in rns-cox3 is phylogenetically conserved, and allowed the tentative identification of conserved sequence blocks.

ACCESSION NUMBER: 2002409827 MEDLINE
DOCUMENT NUMBER: PubMed ID: 12165838
TITLE: The mitochondrial genome of Acropora tenuis (Cnidaria; Scleractinia) contains a large group I intron and a candidate control region.
AUTHOR: van Oppen Madeleine J H; Catmull Julian; McDonald Brenda J; Hislop Nikki R; Hagerman Paul J; Miller David J
CORPORATE SOURCE: Biochemistry and Molecular Biology, James Cook University, Townsville, Queensland 4811, Australia.
CONTRACT NUMBER: GM35305 (NIGMS)
SOURCE: Journal of molecular evolution, (2002 Jul) 55 (1) 1-13. Journal code: 0360051. ISSN: 0022-2844.
PUB. COUNTRY: United States
DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals
ENTRY MONTH: 200302
ENTRY DATE: Entered STN: 20020808
Last Updated on STN: 20030205
Entered Medline: 20030204

L27 ANSWER 6 OF 10 MEDLINE on STN

TI Mitochondrial DNA of the coral Sarcophyton glaucum contains a gene for a homologue of bacterial MutS: a possible case of gene transfer from the nucleus to the mitochondrion.

AB The nucleotide sequences of two segments of 6,737 ntp and 258 nto of the 18.4-kb circular mitochondrial (mt) DNA molecule of the soft coral Sarcophyton glaucum (phylum Cnidaria, class **Anthozoa**, subclass Octocorallia, order Alcyonacea) have been determined. The larger segment contains the 3' 191 ntp of the gene for subunit 1 of the respiratory chain NADH dehydrogenase (ND1), complete genes for cytochrome b (Cyt b), ND6, ND3, ND4L, and a bacterial MutS homologue (MSH), and the 5' terminal 1,124 ntp of the gene for the large subunit rRNA (1-rRNA). These genes are arranged in the order given and all are transcribed from the same strand of the molecule. The smaller segment contains the 3' terminal 134 ntp of the ND4 gene and a complete tRNA(f-Met) gene, and these genes are transcribed in opposite directions. As in the hexacorallian anthozoan, Metridium senile, the mt-genetic code of S. glaucum is near standard: that

is, in contrast to the situation in mt-genetic codes of other invertebrate phyla, AGA and AGG specify arginine, and ATA specifies isoleucine. However, as appears to be universal for metazoan mt-genetic codes, TGA specifies tryptophan rather than termination. Also, as in M. senile the mt-tRNA(f-Met) gene has primary and secondary structural features resembling those of Escherichia coli initiator tRNA, including standard dihydrouridine and T psi C loop sequences, and a mismatched nucleotide pair at the top of the amino-acyl stem. The presence of a mutS gene homologue, which has not been reported to occur in any other known mtDNA, suggests that there is mismatch repair activity in S. glaucum mitochondria. In support of this, phylogenetic analysis of MutS family protein sequences indicates that the S. glaucum mtMSH protein is more closely related to the nuclear DNA-encoded mitochondrial mismatch repair protein (MSH1) of the yeast Saccharomyces cerevisiae than to eukaryotic homologues involved in nuclear function, or to bacterial homologues. Regarding the possible origin of the S. glaucum mtMSH gene, the phylogenetic analysis results, together with comparative base composition considerations, and the absence of an MSH gene in any other known mtDNA best support the hypothesis that S. glaucum mtDNA acquired the mtMSH gene from nuclear DNA early in the evolution of octocorals. The presence of mismatch repair activity in S. glaucum mitochondria might be expected to influence the rate of evolution of this organism's mtDNA.

ACCESSION NUMBER: 1998210232 MEDLINE
DOCUMENT NUMBER: PubMed ID: 9541536
TITLE: Mitochondrial DNA of the coral Sarcophyton glaucum contains a gene for a homologue of bacterial MutS: a possible case of gene transfer from the nucleus to the mitochondrion.
AUTHOR: Pont-Kingdon G; Okada N A; Macfarlane J L; Beagley C T; Watkins-Sims C D; Cavalier-Smith T; Clark-Walker G D; Wolstenholme D R
CORPORATE SOURCE: Department of Biology, University Utah, Salt Lake City 84112, USA.
CONTRACT NUMBER: GM 18375 (NIGMS)
RR 07092 (NCRR)
SOURCE: Journal of molecular evolution, (1998 Apr) 46 (4) 419-31. Journal code: 0360051. ISSN: 0022-2844.
PUB. COUNTRY: United States
DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals
OTHER SOURCE: GENBANK-AF063191; GENBANK-AF063192
ENTRY MONTH: 199805
ENTRY DATE: Entered STN: 19980514
Last Updated on STN: 20000303
Entered Medline: 19980501

L27 ANSWER 7 OF 10 MEDLINE on STN
TI The mitochondrial genome of the sea anemone Metridium senile (Cnidaria): introns, a paucity of tRNA genes, and a near-standard genetic code.
AB The circular, 17,443 nucleotide-pair mitochondrial (mt) DNA molecule of the sea anemone, Metridium senile (class **Anthozoa**, phylum Cnidaria) is presented. This molecule contains genes for 13 energy pathway proteins and two ribosomal (r) RNAs but, relative to other metazoan mtDNAs, has two unique features: only two transfer RNAs (tRNA(f-Met) and tRNA(Trp)) are encoded, and the cytochrome c oxidase subunit I (COI) and NADH dehydrogenase subunit 5 (ND5) genes each include a group I intron. The COI intron encodes a putative homing endonuclease, and the ND5 intron contains the molecule's ND1 and ND3 genes. Most of the unusual characteristics of other metazoan mtDNAs are not found in M. senile mtDNA: unorthodox translation initiation codons and partial translation termination codons are absent, the use of TGA to specify tryptophan is the only genetic code modification, and both encoded tRNAs have primary and secondary structures closely resembling those of standard tRNAs. Also, with regard to size and secondary structure potential, the

mt-s-rRNA and mt-1-rRNA have the least deviation from Escherichia coli 16S and 23S rRNAs of all known metazoan mt-rRNAs. These observations indicate that most of the genetic variations previously reported in metazoan mtDNAs developed after Cnidaria diverged from the common ancestral line of all other Metazoa.

ACCESSION NUMBER: 1998198834 MEDLINE
DOCUMENT NUMBER: PubMed ID: 9539427
TITLE: The mitochondrial genome of the sea anemone Metridium senile (Cnidaria): introns, a paucity of tRNA genes, and a near-standard genetic code.
AUTHOR: Beagley C T; Okimoto R; Wolstenholme D R
CORPORATE SOURCE: Department of Biology, University of Utah, Salt Lake City 84112, USA.
CONTRACT NUMBER: GM-18375 (NIGMS)
SOURCE: Genetics, (1998 Mar) 148 (3) 1091-108.
Journal code: 0374636. ISSN: 0016-6731.
PUB. COUNTRY: United States
DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals
OTHER SOURCE: GENBANK-AF000023
ENTRY MONTH: 199806
ENTRY DATE: Entered STN: 19980611
Last Updated on STN: 19980611
Entered Medline: 19980601

L27 ANSWER 8 OF 10 MEDLINE on STN
TI Homeoboxes in sea anemones (Cnidaria:**Anthozoa**): a PCR-based survey of Nematostella vectensis and Metridium senile.
AB Homeobox genes belong to a phylogenetically widespread family of regulatory genes that play important roles in pattern formation and cell-fate specification in several model systems (e.g., Drosophila, mouse, and C. elegans). Although the evolution of many classes of homeobox genes predates the diversification of the Bilateria, comparatively little is known about homeobox genes in outgroups to the Bilateria, such as the Cnidaria. We used the polymerase chain reaction to recover 12 partial homeoboxes from 2 species of sea anemones, Metridium senile and Nematostella vectensis (phylum Cnidaria; class **Anthozoa**). These homeoboxes appear to represent 9 distinct, mutually paralogous homeobox genes, 5 of which belong to previously identified cnidarian homeobox classes, and 4 of which appear to represent previously unidentified classes. The evolutionary relationships between the homeodomains of sea anemones and of bilaterian animals were assessed through database searches and phylogenetic analyses. As many as 5 of the anemone homeoboxes may belong to the Hox class, which suggests that the Hox gene complement of cnidarians is larger than previously expected. Homologs of the even-skipped gene of Drosophila were also identified in both Metridium and Nematostella.

ACCESSION NUMBER: 97435515 MEDLINE
DOCUMENT NUMBER: PubMed ID: 9290214
TITLE: Homeoboxes in sea anemones (Cnidaria:**Anthozoa**): a PCR-based survey of Nematostella vectensis and Metridium senile.
AUTHOR: Finnerty J R; Martindale M Q
CORPORATE SOURCE: Department of Organismal Biology and Anatomy, University of Chicago, Illinois 60637, USA.
CONTRACT NUMBER: HD07136 (NICHD)
SOURCE: Biological bulletin, (1997 Aug) 193 (1) 62-76.
Journal code: 2984727R. ISSN: 0006-3185.
PUB. COUNTRY: United States
DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals
OTHER SOURCE: GENBANK-A35511; GENBANK-A60092; GENBANK-C44636;

GENBANK-D37042; GENBANK-D44629; GENBANK-E37042;
GENBANK-F44636; GENBANK-H48200; GENBANK-I44629;
GENBANK-L09690; GENBANK-M62871; GENBANK-M62872;
GENBANK-S15548; GENBANK-S22586; GENBANK-S36770;
GENBANK-S39068; GENBANK-S75228; GENBANK-U42726;
GENBANK-U42727; GENBANK-U42728; GENBANK-U42729;
GENBANK-U42730; GENBANK-U42731; GENBANK-U42732;
GENBANK-U42733; GENBANK-U42734; GENBANK-U42735;
GENBANK-U42736; GENBANK-U42737; GENBANK-X05138; +

ENTRY MONTH: 199709
ENTRY DATE: Entered STN: 19971013
Last Updated on STN: 19971013
Entered Medline: 19970929

L27 ANSWER 9 OF 10 MEDLINE on STN

TI Systematic relationships within the **Anthozoa** (Cnidaria: **Anthozoa**) using the 5'-end of the 28S rDNA.

AB Systematic relationships among the subclasses of **Anthozoa**, and especially among the orders Scleractinia, Actiniaria, and Corallimorpharia of subclass Zoantharia, were investigated by applying parsimony and distance methods of analysis to nucleotide sequence data obtained for the 5' end of the 28S rDNA. Exhaustive parsimony analysis indicates that the Ceriantipatharia are most representative of the ancestral **Anthozoa** . When applied to a wide range of scleractinians (nine taxa), actiniarians (seven taxa), and corallimorpharians (six taxa), both parsimony and distance analyses resolve three groups, one being the Scleractinia and the others containing both actiniarians and corallimorpharians. This indicates an unclear relationship between Actiniaria and Corallimorpharia and gives no support for Hand's hypothesis of scleractinian ancestry of actiniarians and corallimorphians; the monophyly of the Scleractinia, which is strongly supported by our analyses, is evidence to the contrary.

ACCESSION NUMBER: 95392827 MEDLINE
DOCUMENT NUMBER: PubMed ID: 7663762
TITLE: Systematic relationships within the **Anthozoa** (Cnidaria: **Anthozoa**) using the 5'-end of the 28S rDNA.
AUTHOR: Chen C A; Odorico D M; ten Lohuis M; Veron J E; Miller D J
CORPORATE SOURCE: Department of Molecular Sciences, James Cook University of North Queensland, Townsville, Australia.
SOURCE: Molecular phylogenetics and evolution, (1995 Jun) 4 (2) 175-83.
Journal code: 9304400. ISSN: 1055-7903.
PUB. COUNTRY: United States
DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals
OTHER SOURCE: GENBANK-S79592
ENTRY MONTH: 199510
ENTRY DATE: Entered STN: 19951020
Last Updated on STN: 19951020
Entered Medline: 19951012

L27 ANSWER 10 OF 10 MEDLINE on STN

TI Class-level relationships in the phylum Cnidaria: molecular and morphological evidence.

AB The evolutionary history of cnidarian life cycles has been debated since the 1880s, with different hypotheses favored even by current textbooks. Contributing to the disagreement is the fact that the systematic relationships of the four cnidarian classes have received relatively little examination using modern systematic methods. Here we present analyses of class-level relationships based on 18S ribosomal DNA (rDNA) sequence, mitochondrial 16S rDNA sequence, mitochondrial genome structure, and morphological characters. DNA sequences were aligned using a

repeatable parsimony-based approach incorporating a range of alignment parameters. Analyses of individual data sets and of all data combined are unanimous in grouping the classes possessing a medusa stage, leaving the holobenthic **Anthozoa** basal within the phylum.

ACCESSION NUMBER: 95387992 MEDLINE
DOCUMENT NUMBER: PubMed ID: 7659022
TITLE: Class-level relationships in the phylum Cnidaria: molecular and morphological evidence.
AUTHOR: Bridge D; Cunningham C W; DeSalle R; Buss L W
CORPORATE SOURCE: Department of Invertebrates, American Museum of Natural History, New York, New York 10024, USA.
SOURCE: Molecular biology and evolution, (1995 Jul) 12 (4) 679-89. Journal code: 8501455. ISSN: 0737-4038.
PUB. COUNTRY: United States
DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals
OTHER SOURCE: GENBANK-U19371; GENBANK-U19372; GENBANK-U19373; GENBANK-U19374; GENBANK-U19375; GENBANK-U19376; GENBANK-U19377; GENBANK-U19378; GENBANK-U19379; GENBANK-U19541; GENBANK-U19542; GENBANK-U19543; GENBANK-U19544; GENBANK-U19545; GENBANK-U19546; GENBANK-U19547; GENBANK-U19548; GENBANK-U19549; GENBANK-U19550; GENBANK-U19551; GENBANK-U19552; GENBANK-U19553
ENTRY MONTH: 199510
ENTRY DATE: Entered STN: 19951013
Last Updated on STN: 19951013
Entered Medline: 19951005

=> d his

(FILE 'HOME' ENTERED AT 16:11:28 ON 15 SEP 2004)

FILE 'MEDLINE, USPATFULL, DGENE, EMBASE, WPIDS, FSTA, CEN, CEABA-VTB, BIOSIS' ENTERED AT 16:12:03 ON 15 SEP 2004

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L1          522 S ANTHOZOAN
L2         1784 S CNIDARIAN
L3           81 S L1 AND L2
L4           72 S L2 AND CHROMOPROTEIN
L5           24 S L4 AND (NON-BIOLUMINESCENT)
L6           24 S L5 AND L1
               E LUKYANOV,S/AU
               E YANUSHEVICH, Y/AU
L7            3 S E1
               E SAVITSKY, A/AU
               E FRADKOV, A/AU
L8           52 S L2 AND NON-AGGREGATING
L9           51 S L4 AND L8
L10           0 S L9 AND MUTATN
L11          51 S L9 AND MUTANT
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FILE 'MEDLINE' ENTERED AT 16:22:52 ON 15 SEP 2004

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L12           0 S L11
L13           0 S CNIDARIAN+NT/CT
               E CNIDAR?
L14        2392 S E5
L15         990 S E6
L16         151 S E7
               E ANTHOZO?
L17         407 S E4
L18          53 S E7
L19          16 S E8
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L20             0 S ANTHOZOAN+NT/CT
L21            72 S L14 AND L17
L22             0 S L21 AND L4
L23             0 S L21 AND L5
L24             0 S L21 AND (NON-BIOLUMINESCENT)
L25             0 S L21 AND FLUORESCENT MUTANT
L26            14 S L15 AND L18
L27            10 S L17 AND NUCLEIC ACID

=> s nucleic acid
        170490 NUCLEIC
       1281458 ACID
L28     157272 NUCLEIC ACID
                 (NUCLEIC(W)ACID)

=> s l28 and encoding protein
        100550 ENCODING
       1307055 PROTEIN
           273 ENCODING PROTEIN
                 (ENCODING(W)PROTEIN)
L29         40 L28 AND ENCODING PROTEIN

=> s l29 and l17
L30             0 L29 AND L17

=> s l29 and l18
L31             0 L29 AND L18

=> s l129 and l19
L129 NOT FOUND
The L-number entered could not be found.  To see the definition
of L-numbers, enter DISPLAY HISTORY at an arrow prompt (=>).

=> s l29 and l19
L32             0 L29 AND L19

=> s l21 and l29
L33             0 L21 AND L29

=> d his

     (FILE 'HOME' ENTERED AT 16:11:28 ON 15 SEP 2004)

     FILE 'MEDLINE, USPATFULL, DGENE, EMBASE, WPIDS, FSTA, CEN, CEABA-VTB,
     BIOSIS' ENTERED AT 16:12:03 ON 15 SEP 2004
L1            522 S ANTHOZOAN
L2           1784 S CNIDARIAN
L3             81 S L1 AND L2
L4             72 S L2 AND CHROMOPROTEIN
L5             24 S L4 AND (NON-BIOLUMINESCENT)
L6             24 S L5 AND L1
                  E LUKYANOV,S/AU
                  E YANUSHEVICH, Y/AU
L7              3 S E1
                  E SAVITSKY, A/AU
                  E FRADKOV, A/AU
L8             52 S L2 AND NON-AGGREGATING
L9             51 S L4 AND L8
L10             0 S L9 AND MUTATN
L11            51 S L9 AND MUTANT

     FILE 'MEDLINE' ENTERED AT 16:22:52 ON 15 SEP 2004
L12             0 S L11
L13             0 S CNIDARIAN+NT/CT
```

		E	CNIDAR?
L14	2392	S	E5
L15	990	S	E6
L16	151	S	E7
		E	ANTHOZO?
L17	407	S	E4
L18	53	S	E7
L19	16	S	E8
L20	0	S	ANTHOZOAN+NT/CT
L21	72	S	L14 AND L17
L22	0	S	L21 AND L4
L23	0	S	L21 AND L5
L24	0	S	L21 AND (NON-BIOLUMINESCENT)
L25	0	S	L21 AND FLUORESCENT MUTANT
L26	14	S	L15 AND L18
L27	10	S	L17 AND NUCLEIC ACID
L28	157272	S	NUCLEIC ACID
L29	40	S	L28 AND ENCODING PROTEIN
L30	0	S	L29 AND L17
L31	0	S	L29 AND L18
L32	0	S	L29 AND L19
L33	0	S	L21 AND L29

Refine Search

Search Results -

Terms	Documents
L4 and L11	4

Database:
US Pre-Grant Publication Full-Text Database
US Patents Full-Text Database
US OCR Full-Text Database
EPO Abstracts Database
JPO Abstracts Database
Derwent World Patents Index
IBM Technical Disclosure Bulletins

Search: L12

Refine Search | Recall Text | Clear | Interrupt

Search History

DATE: Wednesday, September 15, 2004 Printable Copy Create Case

Set Name side by side	Query	Hit Count	Set Name result set
DB=USPT; PLUR=YES; OP=OR			
L12	l4 and L11	4	L12
L11	L10 and chromoprotein	173	L11
L10	l2 and nucleic acid	668621	L10
L9	L7 and l2	0	L9
L8	fradkov.in.	0	L8
L7	savitsky.in.	33	L7
L6	yanushevich.in.	0	L6
L5	L4 and l2	10	L5
L4	Anthozoan	28	L4
L3	L2 and l1	0	L3
L2	Cnidarian	56	L2
L1	lukyanov.in.	8	L1

END OF SEARCH HISTORY

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Hit List

Clear | Generate Collection | Print | Fwd Refs | Bkwd Refs | Generate OACS

Search Results - Record(s) 1 through 4 of 4 returned.

☐ 1. Document ID: US 6689391 B2

L12: Entry 1 of 4 File: USPT Feb 10, 2004

US-PAT-NO: 6689391
DOCUMENT-IDENTIFIER: US 6689391 B2

TITLE: Natural non-polar fluorescent dye from a non-bioluminescent marine invertebrate, compositions containing the said dye and its uses

DATE-ISSUED: February 10, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Goswami; Usha	Goa			IN
Ganguly; Anutosh	Goa			IN

US-CL-CURRENT: 424/559; 424/520, 424/547, 435/41, 435/810, 435/968, 8/648

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWMC | Draw De

☐ 2. Document ID: US 6436682 B1

L12: Entry 2 of 4 File: USPT Aug 20, 2002

US-PAT-NO: 6436682
DOCUMENT-IDENTIFIER: US 6436682 B1

TITLE: Luciferases, fluorescent proteins, nucleic acids encoding the luciferases and fluorescent proteins and the use thereof in diagnostics, high throughput screening and novelty items

DATE-ISSUED: August 20, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Bryan; Bruce J.	Beverly Hills	CA		
Szent-Gyorgyi; Christopher	Pittsburgh	PA		

US-CL-CURRENT: 435/189; 124/74, 124/76, 222/1, 42/54, 435/183, 446/473

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWMC | Draw De

h e b b g e e e f e ef b e

☐ 3. Document ID: US 6414119 B1

L12: Entry 3 of 4 File: USPT Jul 2, 2002

US-PAT-NO: 6414119
DOCUMENT-IDENTIFIER: US 6414119 B1
**** See image for Certificate of Correction ****

TITLE: Rapidly greening, low oxygen mutant of the aequoria victoria green fluorescent protein

DATE-ISSUED: July 2, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Fisher; Hugh	North Brunswick	NJ		

US-CL-CURRENT: 530/350; 435/189

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWMC | Draw De

☐ 4. Document ID: US 6232107 B1

L12: Entry 4 of 4 File: USPT May 15, 2001

US-PAT-NO: 6232107
DOCUMENT-IDENTIFIER: US 6232107 B1

TITLE: Luciferases, fluorescent proteins, nucleic acids encoding the luciferases and fluorescent proteins and the use thereof in diagnostics, high throughput screening and novelty items

DATE-ISSUED: May 15, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Bryan; Bruce J.	Beverly Hills	CA	90210	
Szent-Gyorgyi; Christopher	Pittsburgh	PA		

US-CL-CURRENT: 435/189; 435/183, 435/252.2, 435/320.1, 435/6, 435/69.1, 435/8

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWMC | Draw De

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Terms	Documents
L4 and L11	4

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Refine Search

Search Results -

Terms	Documents
L16 and (non-aggregating)	0

Database:
US Pre-Grant Publication Full-Text Database
US Patents Full-Text Database
US OCR Full-Text Database
EPO Abstracts Database
JPO Abstracts Database
Derwent World Patents Index
IBM Technical Disclosure Bulletins

Search: L17

Refine Search

Recall Text | Clear | Interrupt

Search History

DATE: Wednesday, September 15, 2004 Printable Copy Create Case

Set Name side by side	Query	Hit Count	Set Name result set
DB=USPT; PLUR=YES; OP=OR			
L17	L16 and (non-aggregating)	0	L17
L16	l2 and mutant	43	L16
L15	L2 and non-aggregating	0	L15
L14	L13 and l2	0	L14
L13	discosoma	5	L13
L12	l4 and L11	4	L12
L11	L10 and chromoprotein	173	L11
L10	l2 and nucleic acid	668621	L10
L9	L7 and l2	0	L9
L8	fradkov.in.	0	L8
L7	savitsky.in.	33	L7
L6	yanushevich.in.	0	L6
L5	L4 and l2	10	L5
L4	Anthozoan	28	L4

h e b b cg b e e ch

L3	L2 and l1	0	L3
L2	Cnidarian	56	L2
L1	lukyanov.in.	8	L1

END OF SEARCH HISTORY

Hit List

Clear | Generate Collection | Print | Fwd Refs | Bkwd Refs | Generate OACS

Search Results - Record(s) 1 through 5 of 5 returned.

☐ 1. Document ID: US 6723537 B2

L13: Entry 1 of 5 File: USPT Apr 20, 2004

US-PAT-NO: 6723537
DOCUMENT-IDENTIFIER: US 6723537 B2

TITLE: Directed evolution of protein in mammalian cells

DATE-ISSUED: April 20, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Peelle; Beau	Somerville	MA		

US-CL-CURRENT: 435/69.1; 435/6, 530/350, 536/23.1

Full | Title | Citation | Front | Review | Classification | Date | Reference | [illegible] | Claims | KWIC | Draw De

☐ 2. Document ID: US 6689391 B2

L13: Entry 2 of 5 File: USPT Feb 10, 2004

US-PAT-NO: 6689391
DOCUMENT-IDENTIFIER: US 6689391 B2

TITLE: Natural non-polar fluorescent dye from a non-bioluminescent marine invertebrate, compositions containing the said dye and its uses

DATE-ISSUED: February 10, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Goswami; Usha	Goa			IN
Ganguly; Anutosh	Goa			IN

US-CL-CURRENT: 424/559; 424/520, 424/547, 435/41, 435/810, 435/968, 8/648

Full | Title | Citation | Front | Review | Classification | Date | Reference | [illegible] | Claims | KWIC | Draw De

☐ 3. Document ID: US 6667153 B1

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L13: Entry 3 of 5 File: USPT Dec 23, 2003

US-PAT-NO: 6667153
DOCUMENT-IDENTIFIER: US 6667153 B1

TITLE: Composition and method for detecting mutagens

DATE-ISSUED: December 23, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Thomas; Susan Margaret	Mitcham SA 5062			AU

US-CL-CURRENT: 435/6; 435/91.2, 536/23.1, 536/24.3, 536/24.31, 536/24.33

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWIC | Draw De

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☐ 4. Document ID: US 6596499 B2

L13: Entry 4 of 5 File: USPT Jul 22, 2003

US-PAT-NO: 6596499
DOCUMENT-IDENTIFIER: US 6596499 B2

TITLE: Membrane molecule indicator compositions and methods

DATE-ISSUED: July 22, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Jalink; Kees	Heemstede			NL

US-CL-CURRENT: 435/7.1; 435/252.3, 435/320.1, 435/325, 435/7.8, 435/7.9, 436/172, 436/86, 536/23.5

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWIC | Draw De

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☐ 5. Document ID: US 6342379 B1

L13: Entry 5 of 5 File: USPT Jan 29, 2002

US-PAT-NO: 6342379
DOCUMENT-IDENTIFIER: US 6342379 B1

TITLE: Detection of transmembrane potentials by optical methods

DATE-ISSUED: January 29, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY

h e b b g e e e f e ef b e

Tsien; Roger Y. La Jolla CA
Gonzalez, III; Jesus E. San Diego CA

US-CL-CURRENT: 435/173.4; 435/29, 436/172, 436/519, 436/546, 436/63, 436/805

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWMC | Draw De

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Terms	Documents
discosoma	5

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